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Calling All Educators and Students!

The Canadian Journal of Emergency Nursing plans to launch a new feature "Emergency Nursing Education Showcase" for the Spring 2023 issue. We plan to showcase a variety of scholarly work demonstrating the techniques and the outcomes of Emergency Nursing education. Do you have a unique education format that was developed to address education during the pandemic? Do you have education strategies others could benefit from? Are you or your students doing scholarly work such as case studies or research? We are keen to receive unique case presentations, trending situations / presentations or traditional emergency education material that could be published in the CJEN bi-yearly journal. We would like to hear from you!

For more information, please contact feature editors
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Carrie Meagher – cmeagher2@bcit.ca

Appel à tous les enseignant(e)s et étudiant(e)s !

Le *Journal Canadien des Infirmières d'Urgence* prévoit de lancer une nouvelle rubrique pour le numéro du printemps 2023, intitulée « Vitrine sur l'enseignement des soins infirmiers d'urgence ». Nous avons l'intention de présenter une variété de travaux d'érudition démontrant les techniques et les résultats de l'enseignement des soins infirmiers d'urgence. Disposez-vous d'un format pédagogique unique qui a été développé pour aborder l'éducation pendant la pandémie ? Avez-vous des stratégies éducatives dont les autres pourraient bénéficier ? Vos étudiants ou vous-même effectuez-vous des travaux scientifiques tels que des études de cas ou des recherches ? Nous sommes vivement intéressés à recevoir des présentations de cas uniques, des situations ou des exposés d'actualité ou du matériel pédagogique traditionnel sur les urgences qui pourraient être publiés dans la revue semestrielle du JCIU. N'hésitez pas à nous contacter !

Pour plus de renseignements, veuillez s'il vous plaît vous adresser aux rédactrices en chef
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CLINICIAN'S CORNER

The Canadian Cervical Spine Rule

By Allan Lai, MSN RN ENC(C), Monique Mclaughlin, MN, NP(F), and Nicole Cook, MSN, APRN, AGCNS-BC, CEN, CCRN, TCRN

A 44-year-old driver of a small sedan self-presents to your emergency department (ED) triage area indicating they developed a stiff neck 30 minutes after they were rear-ended by a small van when they were stopped at a traffic light. The rear bumper of the patient's vehicle is slightly dented, and there is scuffing to the front bumper of the van. No airbags were deployed and the driver of the sedan did not hit their head. The van was estimated to be travelling between 10-20 km/h at the time of impact. The patient self-extricated from their vehicle and was ambulatory at the scene. Currently, the patient is alert, oriented, and in no distress. The patient denies paresthesia, has no midline cervical spine (c-spine) tenderness, and is able to actively rotate their neck 45° left and right.

As the triage nurse, you ask yourself: Will this patient need some form of diagnostic imaging of their neck? And if they do, should they be wearing a hard neck collar (henceforth referred to as hard collar) to theoretically protect their spine from injury? You are hesitant to apply a hard collar because you have heard that hard collars can cause patient harm and its use to truly protect the c-spine has been questioned (Kwan et al., 2001; Lai & Paquin, 2019; Rezaie, 2017). You decide to use the Canadian C-Spine Rule (CCR) to help guide your decision-making.

What is the CCR?

The CCR takes a patient's history and physical symptoms and combines them into a clinical decision-making tool to help guide a clinician decide if diagnostic imaging of the c-spine is needed to capture a clinically significant neck injury (Stiell et al., 2001). Clinically significant neck injuries are defined as a c-spine fracture, dislocation, or ligamentous instability, in alert and stable patients who have suffered a blunt traumatic injury (Stiell et al., 2001). The CCR has a 100% sensitivity and 43.4% specificity when applied by triage nurses in the ED (Stiell et al., 2010), 100% sensitivity and a 42.5% specificity when applied by emergency physicians (Stiell et al., 2003), and 100% sensitivity and 37.7% specificity when applied by paramedics in an out-of-hospital setting (Vaillancourt et al., 2009). The CCR has been shown to be superior to unstructured physician judgement (Bandiera et al., 2003) and more sensitive and specific than the National Emergency X-Radiography Utilization Study (NEXUS) tool (Stiell et al., 2003).

How does the CCR help me decide if the patient needs a hard neck brace?

The CCR does not directly instruct you to use a hard collar, rather the CCR suggests if diagnostic imaging of the neck is needed; *this means the CCR indirectly suggests when a hard collar should be applied*. A patient with a CCR that suggests no diagnostic imaging is needed implies that a hard collar is probably not required and, conversely, a CCR suggesting the need for diagnostic imaging implies a hard collar may be required.

What is the evidence supporting nurses to use the CCR?

A prospective cohort study in six Canadian EDs found that triage nurses who had additional training in the CCR could appropriately apply the CCR to both apply *and* discontinue a hard neck brace (Stiell et al., 2010); these findings were validated in 2018 by Stiell et al.

When can I use the CCR?

The CCR is validated for use in patients who have experienced a blunt traumatic injury, have a Glasgow Coma Scale (GCS) of 15, and where there is a concern for c-spine injury. If the patient meets these criteria, the CCR algorithm is followed (Figure 1).

How do I apply the CCR?

Using the case above as an example, the CCR would be applied in the following steps:

1. **MEETS** inclusion criteria: GCS 15, stable, and sustained blunt trauma where c-spine injury is a concern
2. **NO** high risk-factor: Age less than or equal to 65, no dangerous mechanism, and no paraesthesia
3. **ABLE TO** actively rotate neck 45° to the left and right.

The CCR *suggests* the patient does not need diagnostic imaging of the c-spine and *indirectly suggests* the patient does not need a hard collar.

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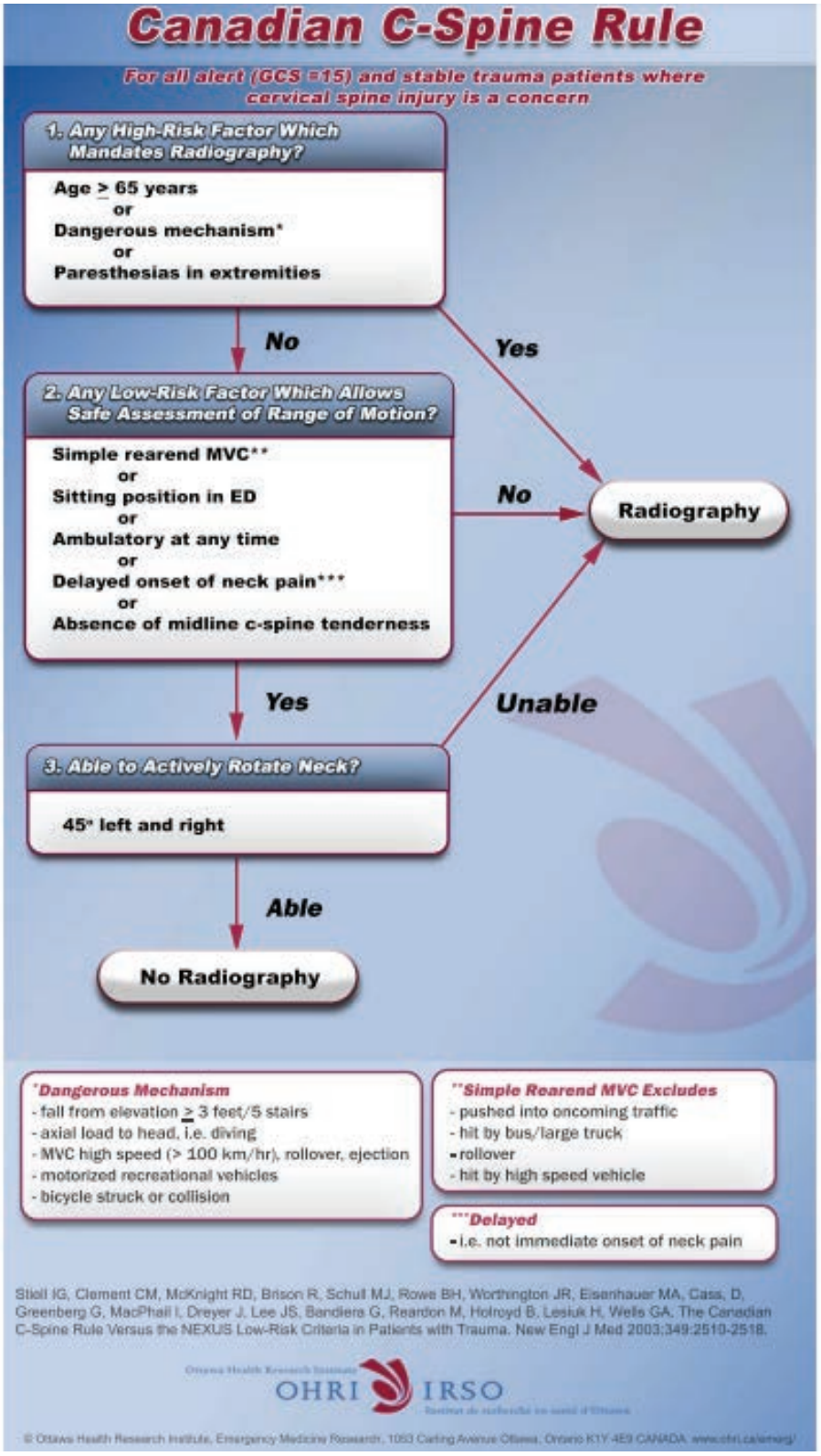
Figure 1

Canadian Cervical Spine Rule



Note. Image courtesy of the Ottawa Hospital Research Institute (n.d.).

Do I need extra training to use the CCR?

Assessment of c-spine injuries and application of a hard collar will likely require some degree of extra training. One pilot study found that nurses learning to apply the CCR required further training to assess for c-spine midline tenderness and range of motion and to remove hard collars (Kelly et al., 2004). Moreover, the nurses in the Stiell et al. (2010; 2018) studies received additional education and training ranging from 90–120 minutes to implement the CCR. It is unclear what type and how much experience nurses must have in order to competently implement the CCR because the studies largely included senior ED nurses and there was little description of their characteristics; however, given that the Stiell et al. (2010; 2018) articles included ED triage nurses, a position that often requires emergency nursing experience, who then acquired additional education to implement the CCR, it is reasonable to infer that ED nurses should have some experience, and take additional training before implementing the CCR.

Summary

ED nurses can use the CCR to support their decision to place hard collars for alert, stable patients under 65 years of age who present with delayed, non-midline neck pain, and without paraesthesia following a non-dangerous blunt traumatic injury. Integration of ED nurse-performed CCR will require additional education and policy changes at local and governing levels. Finally, always practice within your own local scope of practice, policies, and level of comfort.

About the authors

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LE COIN DU CLINICIEN

La Règle canadienne concernant la radiographie de la colonne cervicale (Canadian C-Spine Rule)

par Allan Lai, MSN, I.A., CSU (C), Monique Mclaughlin, MN, NP(F), et Nicole Cook, MSN, APRN, AGCNS-BC, CEN, CCRN, TCRN

Un conducteur âgé de 44 ans au volant d'une petite berline se présente spontanément au triage de votre service d'urgence déclarant qu'il a développé un torticolis 30 minutes après avoir été embouti par une camionnette en attendant à un feu rouge. Le pare-chocs arrière de sa voiture est légèrement cabossé, et le pare-chocs avant de la camionnette est égratigné. Aucun coussin gonflable ne s'est déployé et le conducteur de la berline ne s'est pas cogné la tête. D'après le patient, la camionnette roulait entre 10 et 20 km/h au moment de l'impact. Le patient s'est extrait lui-même de son véhicule et était mobile sur les lieux. Actuellement, le patient est alerte, orienté et ne présente aucune détresse. Le patient n'a pas de paresthésie, ne présente pas de sensibilité le long de la ligne médiane de la colonne vertébrale et est capable de tourner activement sa tête de 45° à gauche et à droite.

En tant que membre du personnel infirmier de triage, vous vous demandez : ce patient aura-t-il besoin de réaliser un test d'imagerie diagnostique du cou ? Et si c'est le cas, doit-il porter un collier cervical rigide (désormais appelé collier rigide) pour protéger, en théorie, sa colonne vertébrale de toute blessure ? Vous hésitez à lui appliquer un collier rigide parce que vous avez appris que les colliers rigides peuvent nuire aux patients et que leur utilisation pour protéger véritablement la colonne cervicale a été remise en question (Kwan et coll., 2001 ; Lai et Paquin, 2019 ; Rezaie, 2017). Vous décidez d'utiliser la règle canadienne concernant la radiographie de la colonne cervicale (CCR) pour vous aider à prendre votre décision.

Quel est le CCR ?

Le CCR réunit les antécédents et les symptômes physiques d'un patient pour constituer un outil d'aide à la décision clinique permettant au clinicien de décider si une imagerie diagnostique de la colonne cervicale est nécessaire pour détecter une blessure au cou significative sur le plan clinique (Stiell et coll., 2001). Les lésions cervicales significatives sur le plan clinique sont définies comme étant une fracture, une dislocation ou une instabilité ligamentaire de la colonne cervicale, chez des patients alertes et stables ayant subi un traumatisme contondant (Stiell et coll., 2001). Le CCR se caractérise par une sensibilité de 100 % et une spécificité de 43,4 % lorsqu'il est appliqué par le personnel infirmier de triage aux urgences (Stiell et coll., 2010), une sensibilité de 100 % et une spécificité de 42,5 % lorsqu'il est appliqué par les médecins d'urgence (Stiell et coll., 2003), et une sensibilité de 100 % et une spécificité de 37,7 % lorsqu'il est appliqué par les ambulanciers paramédicaux en dehors du milieu hospitalier (Vaillancourt et coll., 2009). Le CCR s'est avéré supérieur au jugement non structuré du médecin (Bandiera et coll., 2003) et plus sensible et spécifique que l'outil NEXUS (National Emergency X-Radiography Utilization Study) (Stiell et coll., 2003).

Comment le CCR m'aide-t-il à décider si le patient a besoin d'un collier cervical rigide ?

Le CCR ne donne pas d'instructions directes sur l'utilisation d'un collier rigide, il précise plutôt si une imagerie diagnostique du cou est nécessaire, *ce qui signifie que le CCR indique indirectement quand un collier rigide doit être appliqué.* Un patient avec un CCR qui recommande de ne pas recourir à l'imagerie diagnostique implique qu'un collier rigide n'est probablement pas nécessaire. En revanche, un CCR proposant la nécessité d'une imagerie diagnostique implique qu'un collier rigide peut être nécessaire.

Quelles sont les données probantes appuyant l'utilisation du CCR par le personnel infirmier ?

Une étude de cohorte prospective menée dans six services d'urgence canadiens a révélé que le personnel infirmier de triage ayant reçu une formation supplémentaire sur le CCR pouvait l'appliquer de manière appropriée pour mettre en place et interrompre le port d'un collier rigide (Stiell et coll., 2010) ; ces résultats ont été validés en 2018 par Stiell et coll.

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Quand puis-je me servir du CCR ?

Le CCR est validé pour son utilisation chez les patients ayant subi un traumatisme contondant, dont l'échelle de coma de Glasgow (GCS) est de 15, et pour lesquels il existe un risque de lésion de la colonne vertébrale. Si le patient répond à ces critères, il faut suivre l'algorithme CCR (Figure 1).

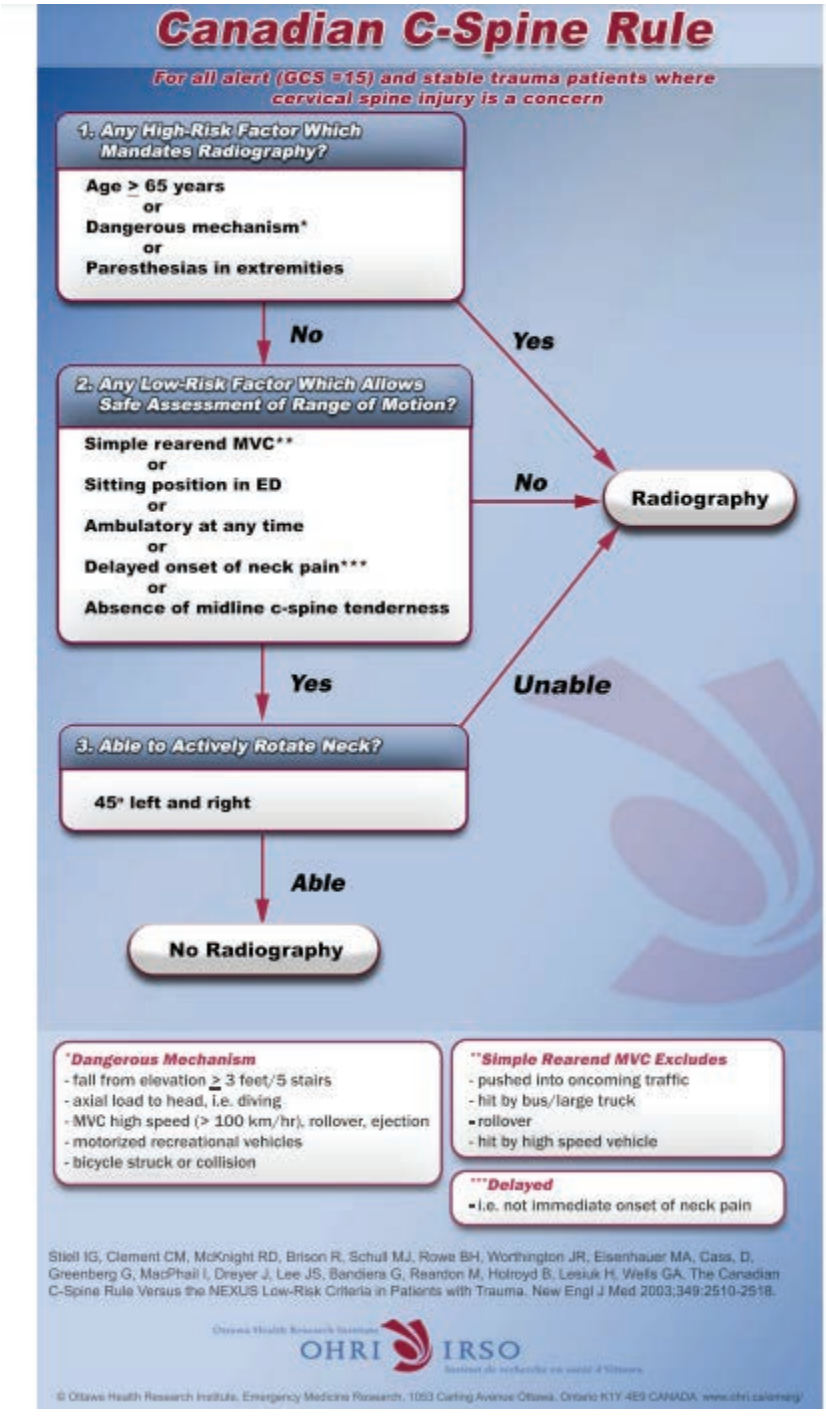
Comment dois-je appliquer le CCR ?

En se servant du cas ci-dessus à titre d'exemple, le CCR serait appliqué selon les étapes suivantes :

1. **RÉPOND** aux critères d'inclusion : GCS 15, stable, et traumatisme contondant avec risque de lésion de la colonne vertébrale

Figure 1

Règle canadienne concernant la radiographie de la colonne cervicale



Note. Image fournie par l'Institut de recherche de l'Hôpital d'Ottawa (s.d.)

2. **AUCUN** facteur de risque élevé : Âge inférieur ou égal à 65 ans, absence de mécanisme de blessure dangereux, absence de paresthésie
3. **CAPABLE** de tourner la tête activement de 45° vers la gauche et la droite.

Le CCR indique que le patient n'a pas besoin d'une imagerie diagnostique du rachis cervical et suggère indirectement que le patient n'a pas besoin d'un collier cervical rigide.

Ai-je besoin d'une formation supplémentaire pour utiliser le CCR ?

L'évaluation des blessures de la colonne vertébrale et l'application d'un collier cervical rigide exigeront vraisemblablement une formation supplémentaire. Une étude pilote a montré que le personnel infirmier qui apprenait comment appliquer le CCR avait besoin d'une formation supplémentaire pour pouvoir évaluer la sensibilité de la ligne centrale de la colonne vertébrale et l'amplitude des mouvements et pour retirer les colliers rigides (Kelly et coll., 2004). Par ailleurs, le personnel infirmier des études de Stiell et coll. (2010; 2018) a reçu un enseignement et une formation supplémentaires de 90 à 120 minutes pour pouvoir pratiquer le CCR. Vu que les études portent essentiellement sur des membres du personnel infirmier chevronnés des services d'urgence et que leurs qualités sont peu connues, on ne sait pas exactement quel type et quel niveau d'expérience le personnel infirmier doit posséder pour appliquer le CCR de façon compétente. Toutefois, étant donné que les articles de Stiell et coll. (2010; 2018) portent sur des membres du personnel infirmier de triage des urgences, un poste qui exige souvent de l'expérience en soins infirmiers d'urgence, qui ont par la suite suivi une formation supplémentaire pour appliquer le CCR, on peut raisonnablement en déduire que le personnel infirmier des services d'urgence doit posséder une certaine expérience et suivre une formation supplémentaire avant d'appliquer le CCR.

Récapitulatif

Le personnel infirmier des urgences peut utiliser le CCR pour éclairer sa décision de placer des colliers rigides chez les patients de moins de 65 ans, alertes et stables, qui présentent une douleur cervicale retardée, non médiane, et sans paresthésie à la suite d'un traumatisme contondant non dangereux. L'intégration du CCR effectué par le personnel infirmier de l'urgence nécessitera une formation supplémentaire et des révisions de politiques au niveau local et gouvernemental. Enfin, il convient de toujours exercer dans le cadre de son propre champ d'exercices, de ses propres politiques et de son propre niveau de confort.

Notes des auteurs

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Emergency Nurses' Perceptions of Leadership Strategies and Intention to Leave: A scoping review of the literature

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Abstract

Background: Retention of registered nurses in emergency departments (EDs) is as a critical issue, further exacerbated by the COVID pandemic. Leaders influence work life and working environment, but it is unclear what strategies leaders use to address nurse staffing issues in the ED. The purpose of this scoping review is to understand if leadership strategies used in EDs have links to nursing retention and turnover.

Methodology: This scoping review was completed with a comprehensive search within Cumulative Index to Nursing and Allied Health Literature, EMCARE, and EMBASE. Two authors developed inclusion and exclusion criteria, did title and abstract screening, and full text screening using review software. The included studies had data extracted and analyzed to determine leadership strategies and relationships to intent to stay, retention, intent to leave, or turnover.

Results: Of the 553 records identified, nine met inclusion criteria. Leadership strategies identified in the studies included support from supervisor, engagement by the leader, organizational culture assessment, and a cultural change toolkit. No leadership strategy directly influenced nurse intention to stay, retention, intention to leave or turnover.

Conclusion: Emergency nurse retention and the prevention of turnover is a multidimensional issue stemming from various factors that may not be controllable due to the nature of the setting. However, leaders can implement strategies and provide support to staff to enhance quality of work life and the work environment. More information is needed to understand how leaders can influence the current and future supply of emergency nurses to produce quality patient care, and nurse outcomes.

Introduction

The retention of registered nurses (RNs) in the workplace is a global health human resource issue, only further exacerbated by the COVID pandemic (Virkstis et al., 2022). In addition to a multitude of issues facing leaders in healthcare during this time, maintaining a stable nursing workforce is paramount. The pandemic has had an immense impact on front-line nurses' psychological well-being, quality of work life (An et al., 2020) and intention to leave critical care areas, including emergency departments (EDs) (Cornish et al., 2021).

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EDs are a specialty area with consistently low registered nurse retention, and increasingly high turnover (Sawatzky & Enns, 2012). From 2011 to 2020 in Canada, nurses registered with the Canadian Emergency Nursing Certification (ENC_C) has decreased from 1,331 to 884 (Canadian Institute for Health Information [CIHI], 2021). Reasons for decrease in specialization are multifaceted and could include increased stress due to increased patient volume and nursing shortages. Additionally, the stressors that ED nurses are vulnerable to include exposure to traumatizing incidents, higher rates of violence, involvement in life-and-death decisions, as well as hectic and changing work conditions (patient-to-nurse ratios, unpredictability of patient status; Adriaenssens et al., 2011; Sawatzky & Enns, 2012).

Background

The World Health Organization (WHO; 2022) defines emergency care around the world, as the first point of contact with the healthcare delivery system for many patients. The American College of Emergency Physicians (ACEP; 2021) states the definition of emergency services as the provision of evaluation and treatment of any medical condition that may require immediate unscheduled medical care. Emergency nurses include the professional nursing services that work within the department or unit to assist in facilitation of this care for the patient. The scope of an emergency nurse includes a specialized body of knowledge and skills; however, is not limited to triaging and prioritization of patient care, stabilization and resuscitation, crisis interventions, disaster preparedness, patient education, and disease and injury prevention (National Emergency Nurses' Association [NENA], 2018).

Leadership within EDs provides additional structure for nursing services. There are varying definitions of leadership and in the context of nursing may be described as: "providing a vision or direction for the team, alongside the process of influencing the group's actions to a common goal or achievement" (Collins et al., 2019). *Leadership strategies* is a concept describing clear propositions for the accomplishments of leaders to ensure the key goals for organizations are met (Centre for Creative Leadership [CCL], 2022). Leadership strategies typically encompass different skills, characteristics and behaviours expected from the leaders, alongside certain capabilities that can draw out engagement of employees, and create a desired leadership culture (CCL, 2022). Examples of leadership behaviours that have been indicated to positively influence staff nurse retention are high visibility in the department, support of staff, and sharing leadership responsibilities; undertaking graduate education and leadership training (Kleinman, 2004). Different leadership styles which can assist in bringing these strategies and behaviours into fruition, are participatory management (Volk & Lucas, 1991), transformational leadership (Dunham-Taylor, 2000) and authentic leadership styles (Gardner et al., 2005).

Turnover is defined as the rate that an organization loses its employees, and job satisfaction is the most significant factor influencing this (Lavoie-Tremblay et al., 2019). Intention to leave is a nurse's own perception of their intention to leave the nursing profession and has direct relation to job satisfaction (Lavoie-Tremblay et al., 2019). Retention is the cumulative effect of strategies that go into reducing turnover and intent to leave in the nursing profession, which keep nurses in their positions. In Canada, turnover is expensive and the potential cost of replacing a specialty nurse varies within each organization. Direct costs within the Canadian healthcare system (the hiring process) were estimated to be $64 000 CAD over a decade ago (O'Brien-Pallas et al., 2010), while indirect costs (decreased group morale and loss of productivity) may raise the total much higher.

Interventions to increase emergency nurse retention have been examined and factors that impact this retention vary from the new graduate nurse to the seasoned clinical expert (Valdez, 2008). Many interventions are not within the individual nurse's control. Improvements to work environment and support from leaders can influence emergency nurse turnover costs, but there is no consensus on a specific strategy to move forward (Gorman, 2018). Some research links leadership style to nursing work conditions. For instance, multiple studies show positive effects of an authentic leadership strategy within the nursing profession (Lee et al., 2018; Maziero et al., 2020; Ribeiro do Valle et al., 2020; Yasinki, 2014). A review of studies in critical care suggests leaders who exhibit considerate, transformational, and exemplary leadership influence intent to stay and job satisfaction (Kiwanuka et al. 2021). Research supporting leadership as a key indicator for retention among nurses has raised awareness (Registered Nurses' Association of Ontario [RNAO], 2013), but there are current gaps in the literature as to what strategies may work best to prevent high turnover specifically in emergency departments.

Purpose and Objectives

The purpose of this scoping review is to examine the literature and synthesize the current state of international (English language) knowledge, specific to leadership strategies used in EDs for nurse retention. Our objective is to determine if there are any leadership strategies used by ED managers, and secondly if these management strategies impact: 1) nursing retention, 2) intent to stay, 3) intention to leave, or 4) turnover. The research questions include: 1) What are the specific leadership strategies used by ED managers for nurse retention? 2) Do any of these leadership strategies impact nurse retention, intent to stay, intention to leave or turnover? We chose to conduct a scoping review because it allows for summaries of various study designs useful for programs and policy (Colquhoun et al., 2014). As per scoping review methods there was no methodological evaluation of the quality of included studies, as our focus was not only on nurse retention/turnover outcomes, but to learn more about leadership strategies. On initial review of the literature, very few articles examining leadership strategies in ED were found. Further to this, no current or in-progress scoping or systematic reviews on this topic were identified.

Methods

Search strategy

Arksey and O'Malley's (2005) revised scoping review methodology by Levac et al., (2010) was used to guide this study in five stages: (1) identifying the research question; (2) identifying

studies of relevance; (3) study selection; (4) charting the data; and (5) collating, summarizing, and reporting the results. The search strategy for this review focused on three key concepts: emergency nursing, leadership, and retention/turnover. To be included in the review, papers needed to be published in English, primary research (any research study design type), be published at or after 2010 to focus on recent research and include all key concepts: emergency nurse retention in relation to leadership. With the assistance of an academic health sciences librarian, a comprehensive search was completed within Cumulative Index to Nursing and Allied Health Literature (CINAHL), EMCARE, EMBASE and MEDLINE in four different searches on November 26, 2021. The grey literature was also searched including ProQuest Dissertations & Theses, Theses Canada, Australasian Digital Thesis Program, Electronic Theses Online Service (EthOS), OpenGrey and a modified search of Google Scholar. Subject headings and keywords were used to find articles describing the retention of emergency nurses in relation to leadership. The initial search had no date, age or geographical limits set to increase the quantity of results (See Appendices A, B, & C for search strategy).

Identification of relevant studies

Criteria for inclusion in the review included: articles published in English, articles published between 2010 and November 2021, full text available, published, unpublished or descriptive paper using any research study design type (for example, experimental, quasi-experimental, randomized control trials, meta-analysis, literature reviews, case-study etc.) and must have included the following: nurses working in emergency departments, leadership or leadership strategies, and retention, intent to stay, intent to leave, or turnover. Exclusion criteria included any article published in a language other than English, published before 2010, articles including editorials, commentary, reviews, or book reviews, if the article did not describe a leadership strategy, did not provide information about retention, intent to stay, intent to leave or turnover, or if the results were ambiguous (with specific data on emergency nurses not available). No quality assessments were performed on selected articles as per scoping review methods. Following the search, all identified citations were uploaded into Covidence (Veritas Health Innovation, Melbourne, Australia), and all duplicates were removed.

Study selection

Title and abstract screening were completed by both authors utilizing Rayyan, the web and mobile app for systematic reviews (Ouzzani, 2016). Conflicts were resolved with discussion and consensus between both authors. Full text screening and data extraction were done using Covidence systematic review software (Veritas Health Innovation, 2021). The data extraction template was created by both authors and piloted on three studies to ensure validity. Test screening was completed, and discrepancies were resolved via virtual and email communications between the two authors. The remainder of the articles were assigned to each author respectively to screen and extract data with the template.

Charting the data

The data extracted included specific details about the population, concept, context, study methods, and key findings relevant to the review objective. The data extracted from the included articles was downloaded into an excel file, reviewed by each author, and then discussed together to identify leadership strategies.

Results

Search strategy results

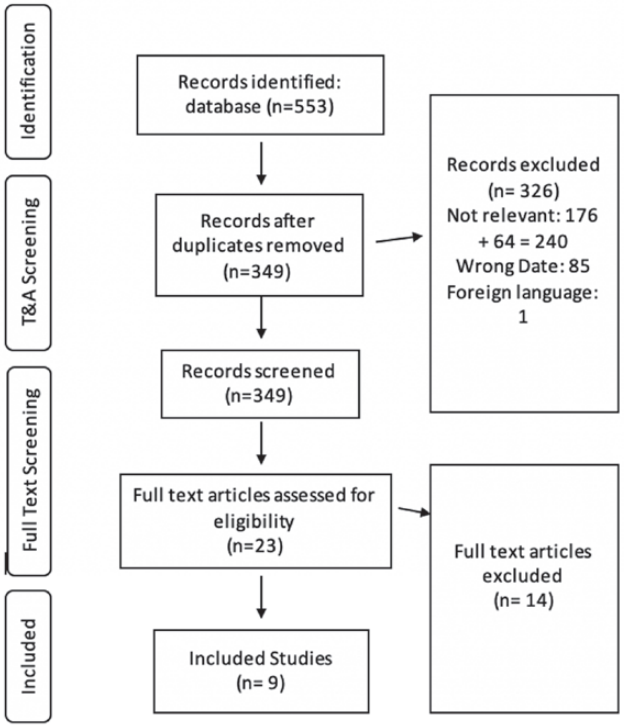
Results of screening and overall yield of papers are presented in the PRISMA flow chart in Figure 1. After duplicates were removed, 349 articles were screened by examining the titles and abstracts; 326 were irrelevant, out of date range, or not in English. Twenty-three full-text articles were assessed, and 14 articles were excluded because they did not address retention, intent to stay, intent to leave, or turnover outcomes in relation to leadership. Also, if we were unable to extract results specific to emergency nurses, or the ED setting, the article was excluded.

Numbers, sources, and types of papers

Of the nine papers included in the review, eight were quantitative. Four of the quantitative studies originated in Europe (Adriaenssens et al., 2011; Adriaenssens et al., 2015; Bruyneel et al., 2017; deWijn et al., 2021), three in North America (Adams et al., 2019; Baker, 2016; Sawatzky & Enns, 2012) and one in Asia (Yen-JuLin et al., 2012). There was one qualitative study from Western Canada (Van Osch et al., 2018).

Figure 1

PRISMA flow diagram



Overview of articles

In what follows, we describe studies in more detail. Our results are organized according to our study objectives. First, we describe reported leadership strategies, and then we describe their impact on intention to leave and turnover.

Leadership strategies in the ED

Most of the literature we found report on nurse's perceptions of leadership in cross-sectional studies. The strategies include social support, engagement, and organizational culture.

Social Support from Supervisor

The leadership strategy most reported was social support from supervisors. A group of four papers, three from Belgium (Adriaenssens et al., 2011; Adriaenssens et al., 2015; Bruyneel et al., 2017), and one from the Netherlands (deWijn et al., 2021), utilized the Leiden Quality of Work Questionnaire for Nurses [LQWQ-N] (Gelsema et al., 2007) The LQWQ-N instrument consists of subscales measuring job and organizational characteristics alongside outcome variables (job satisfaction and turnover intention). The dimension of social support is the only job characteristic item directly related to leadership. In the instrument this appears as "I feel appreciated by my supervisor".

Adriaenssens and colleagues (2011) aimed to compare emergency nurses to other nurses to determine if there was a difference in terms of job characteristics and organizational factors and to understand to what extent those predict job satisfaction, turnover intention, and work engagement in emergency nurses. The participants were 254 emergency nurses from 15 EDs. The authors report that turnover intention was not considered to have a statistically significant affect from social support from supervisor, a subset listed under job characteristics.

In another longitudinal study, Adriaenssens and colleagues (2015) attempted to understand to what extent changes in job characteristics and organizational factors predict distress outcomes (including job satisfaction, turnover intention, and work engagement). They used the LQWQ-N in a two-wave panel design with 18 months in-between the first and second assessment. 204 of 254 nurses were working in the same ED 18 months later, indicating a turnover rate of 19.7% over 18 months. No direct relationship found between the Job Demand Control Support variables used in the LQWQ-N tool and intention to leave. In this study, the sum score for 'support from supervisor' and 'support from colleagues' was used together as a global measure of support, unlike in the other studies where it was reported as a separate factor.

Bruyneel et al., (2017) then used the LQWQ-N tool to examine associations between structural factors, demographic characteristics, and the pathway of nurse wellbeing (including job satisfaction, burnout, and turnover intention). Quality of the work environment was measured with the Practice Environment Scale of the Nursing Work Index [PES-NWI] (Lake, 2002). The cross-sectional multi-centre survey included 294 nurses working in eleven emergency departments. Findings showed nurse management and leadership, along with social support from supervisor, had a statistically significant effect on job satisfaction, but not turnover intention. However, with moderated mediation (conditional indirect effects model), the indirect effect of social support from supervisor and job satisfaction to turnover intention was then only present and significant for the female emergency nurses included in the study.

DeWijn et al., (2021) used the LQWQ-N tool to assess job satisfaction and turnover intention as part of a larger cross-sectional design, with survey responses from 701 emergency nurses. The aim was to determine stress-related outcomes and occupational well-being of emergency nurses in the Netherlands, and to identify demands and resources that best predict employee well-being. Overall, the emergency nurses scored higher on stress-related outcomes than the normative sample of a working population in general. Also, variables in the questionnaire such as staffing and social support from supervisor significantly added to small changes in work engagement, but to a much lesser extent than developmental opportunities did. The study found one third of the nurses plan to leave their job at the hospital within the next three years.

In summary, these four published studies utilized the same LQWQ-N tool and examined the turnover intention of over 1,400 emergency nurses in relation to social support from supervisor. No direct relationship and no statistical significance were found.

Engagement by Leader

In two papers, researchers explored the relationship between leadership engagement and intention to leave using survey designs (Baker, 2016; Sawatzky & Enns, 2012).

Baker (2016) explored factors that influence ED nurse retention and intention to leave. The study was grounded in the Bass Model of Transformational Leadership (Bass et al., 2003) and work engagement described by Schaufeli & Bakker (2004). A survey was developed consisting of transformational style questions from the Multifactor Leadership Questionnaire [MLQ] (Bass & Avolio, 1990), components of the Perceived Nursing Work Environment [PNWE] instrument (Choi et al., 2004) and the Turnover Intention Scale (Mobley et al.,1978). It was administered to a total of 100 Certified Emergency Nurses in the US. The MLQ consists of 20 questions related to inspiration, rational motivation, and personalized attention behaviour to determine leadership style. The components of the PNWE instrument were nursing management, professional practice, nurse/physician collaboration, staffing resources, and shift work. Results suggested no statistical significance between transformational leadership and turnover intention scores, and no statistical difference in nurse manager engagement strategies and turnover intention scores.

Sawatzky & Enns (2012) used a cross sectional study design to describe factors that predict emergency nurses' intention to leave. Using a questionnaire to explore working environment and professional quality of life, 261 nurses working in twelve adult emergency departments in Manitoba, Canada also reported on intention to leave. Over one quarter (26%) of respondents reported they would 'probably' or 'definitely' leave their ED job in the following year. Significant intermediary predictors to leave

current positions included lower engagement (with nursing management as an influencer for engagement).

Organizational Culture

Organizational Cultural Assessment

One paper written by Yen-Ju Lin et al., (2012) used a cross-sectional survey design to explore various cultural effects on work satisfaction and intent to leave for emergency physicians and nurses in Taiwan. 234 nurses and 208 physicians responded from 119 hospitals. An employee satisfaction questionnaire and the Organizational Culture Assessment Instrument [OCAI] were implemented. The OCAI is a tool used to measure four types of cultures in hospital based EDs (clan, adhocracy, hierarchy, and market) and they were examined to determine if there were relationships to nurses' intent to leave. The OCAI was modified by the authors and covered six dimensions including dominant characteristics, leadership, management of employees, organizational glue, strategic emphases, and criteria of success (Yen-Ju Lin et al., 2012). Nurses reported lower work satisfaction with leadership, ED management and hospital policies, than with the physicians, but no statistically significant difference in intent to leave was found between the two groups. Culture was not found to influence effects on intent to leave.

Use of a Cultural Change Toolkit

One paper reported on a program evaluation of leadership strategies to reduce burnout and nurse turnover by improving the perception of the practice environment (Adams et al., 2019). The authors developed and implemented a 'Cultural Change Toolkit' in a 41-bed community emergency department in Southeast Texas. The leadership interventions included shared decision making, meaningful recognition strategies, daily leadership rounding, department specific gratitude boards, thank you cards for staff and leaders, and staff feedback added to established daily emergency department huddles. The Anticipated Turnover Scale (Hinshaw & Atwood, 1982 as cited in Adams, 2019) and Oldenburg Burnout Inventory (Demerouti et al., 2002) were used to measure burnout and anticipated turnover for the 30 ED nurse participants. Results included a reduction in mean rate of anticipated turnover; however, this reduction was not statistically significant. Table 1 provides information about the eight quantitative studies and their reported impact on intention to leave or turnover.

Nurses Description of Leadership

A qualitative study in Western Canada. (Van Osch et al., 2018), used an interpretive descriptive design to explore influential factors and strategies that may promote an experienced nurse's intent to stay in their emergency or critical care area. Ten emergency nurses were included in the study, as well as one nurse who worked both emergency and intensive care. Focus groups were used to collect information about factors that promote continuation of employment in the same department and any unit/employer strategies that may have influenced retention in the department. Valued leadership traits discussed by participants included being accessible, being actively engaged in the unit, and demonstration of clear communication skills with clear expectations set. Many of the reasons participants stayed in their current positions were directly related to these traits of the leaders in the unit. Leaders in the study that influenced these findings included managers, educators, and charge nurses.

In summary, the included articles in this scoping review examined a variety of leadership strategies and the connection to emergency nurse intent to leave, and turnover. We found no consistent leadership strategy or activity influenced emergency nurses' intention to leave or turnover. All but one of the included articles' designs were quantitative in nature and were mainly observational. One article that focused on program implementation and evaluation (Adams et al., 2019) did see results including a reduction in anticipated turnover; however, this was a small study and results were not statistically significant.

Discussion

Emergency nurse retention and the prevention of turnover is a multidimensional issue stemming from various factors that may

Table 1

Impact of Leadership Strategies on Intention to Leave or Turnover

Leadership Strategy	Article	Reported Effect on Intention to Leave or Turnover Intention
Social Support from Supervisor	Adriaenssens et al., 2011	No significant effect
	Adriaenssens et al., 2015	No direct relationship
	Bruyneel et al., 2017	Indirect effect for female nurses
	deWijn et al., 2021	No significant effect
Engagement	Baker, 2016	No significant effect
	Sawatzky & Enns, 2012	Significant intermediary predictors of intention to leave current position included lower engagement (nursing management is an influencer for engagement)
Organizational Culture	Adams et al., 2019	No significant effect
	Yen-JuLin et al., 2012	No culture effects were found to be related to ED nurse intent to leave

be difficult to control due to the nature of the setting. However, leaders can attempt different approaches and provide support to staff to enhance quality of work life and the work environment. This scoping review examined the literature and summarized findings to understand if specific leadership strategies used in EDs have links to nursing retention, intent to stay, intention to leave, or turnover. Our findings provide results describing nurses' perception of leadership strategies and their intention to leave, but little is known about the impact of specific strategies.

Limitations

The literature specific to emergency nurses and leadership strategies was limited and consisted mainly of observational designs. The use of cross-sectional surveys, including established tools such as the LQWQ-N, provided more of a theoretical understanding of variables, but the description of the leadership component in these studies was inadequate. Poorly described interventions, such as appreciation or support by supervisor, provide little information about interventions and do not allow for replication of the study or meta-analysis of findings (Monsen, 2018). The item "I feel appreciated by my supervisor" is part of a subscale of organization characteristics in the LQWQ-N. Potential expansion on this variable or exploration of what the construct of supervisor appreciation means is important for future research and actual uptake in practice.

Implications for Future Research

There appears to be an opportunity for increased experimental, qualitative, and program implementation studies that examine leadership strategies for retention of emergency nurses. The articles providing the most practical and detailed information for use by leaders were a program evaluation of leadership strategies (Adams et al., 2019) and a qualitative study exploring emergency nurse retention (Van Osch et al., 2018). The strategies used in the program evaluation study were modest activities such as nurse recognition, thank you cards and provision of daily feedback to nurses. None of these strategies would prove difficult or expensive, but they do require the presence of the leader on the unit and engagement with staff daily. Being accessible and actively engaged on the unit were leader traits valued by Canadian emergency nurses when asked about intent to stay in the ED (Van Osch et al., 2018). Because of strained hospital budgets and flattening of organizational structures, engagement of, and accessibility to managers or directors is not a straightforward fix, however. Envisioning who the accessible and engaged ED nurse leaders are might be an important next step.

Canadian research was examined regarding emergency nurse retention or turnover and leadership strategies. Despite several Canadian nurse-led research programs focussing on leadership and outcomes (Boamah et al., 2018; Laschinger et al., 2009; Wong et al., 2013), we identified only two relevant studies since 2010 from Canada specific to emergency nurses and the emergency department setting. However, resources have been developed by Canadian nursing organizations for leaders to promote nurse retention. The RNAO endorses transformational leadership (RNAO, 2017) to ensure a supportive workplace and to make significant contributions to a strong workplace culture. The RNAO best practice guideline *Developing and Sustaining Nursing Leadership* (2013), suggests that organizational and system level factors are important determinants of a nurse's healthy work environment. Key evidence-based strategies include building relationships and trust, creating an empowering work environment, being the organizational support, which values the nurses' critical role, creating a culture developed from their own personal resources (resilience, education, and expertise) and professional identity (RNAO, 2013). The Canadian Nurses Association (CNA) and the Canadian Federation of Nurses Unions (CFNU) have implemented an evidence-based tool kit recommending organizational factors and staff outcome indicators which rely on leadership support and engagement (CNA & CFNU, 2015). A pilot project Research to Action, initiated between the CNA and CFNU, was previously implemented across Canada including innovative responsive strategies to facilitate a healthy, positive work environment with leadership empowerment (Silas, 2012).

Implications for Practice

The role of unit charge nurses, specialized nurses, and Advanced Practice Nurses in supporting healthy work environments for nurses in emergency departments is worth exploring. In an Australian study exploring the role of the nurse practitioner (NP) in the ED, nurses reported the NP was empowering and served as a role model (Li et al., 2013). Clinical Nurse Specialist roles typically include leadership, education, and research components in addition to clinical practice (Kilpatrick et al., 2014) and their use in EDs for various patient populations has been reported (Leary & Baxter, 2014; Mullennix et al., 2020; Baldwin et al., 2014). The reported decrease in Canadian nurses maintaining emergency speciality certification through the CNA is concerning (CIHI, 2021). Nurse specialty certification has both organizational and patient care impacts and is shown to be associated with a reduction in turnover (Straka et al., 2014).

Support of nurse retention from a leadership perspective includes active promotion of healthy and safe work environments. Although suboptimal staffing levels lead to lower retention in the profession, a healthy work environment can assist in mitigating this. Lavoie-Tremblay et al. (2019) describe a healthy work environment as a complex idea, where leaders enable nurses to engage in work processes with provided structures, practices, and policies essential in promoting wellbeing of the profession. The American Association of Critical-Care Nurses (AACN; 2019) has presented six evidence-based standards to ensure a healthy work environment: skilled communication, true collaboration, effective decision making, appropriate staffing, meaningful recognition, and authentic leadership.

With no direct leadership strategies identified to improve emergency nurse retention and their intention to stay, leaders may need new tactics for workforce management. Canadian EDs are forecasted to see patient volume and acuity rise exponentially throughout the post pandemic era. Together with the increased work environment stressors that emergency nurses experience, continual turnover and heightened intention to leave will prove a glaring issue. It will be critical to begin exploring specific leadership strategies within the ED to mitigate nurse turnover.

Implications for emergency clinical practice

- The active promotion of health and safe work environments are one strategy that leaders in Emergency Departments can take to support nurse retention.
- All nurses including charge nurses, specialized nurses and Advanced Practice Nurses play a role in creating healthy, supportive work environments for the nursing team.
- Best practice guidelines developed by Canadian nursing organizations exist, and are one strategy for emergency departments seeking evidence to create and maintain leadership in emergency departments

About the authors

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Conflicts of Interest

We, the authorship team declare that there are no conflicts of interest to declare related to this manuscript and this work is unfunded.

Contributions of the authorship team & CRedIT author statement

Samantha Horvath: Conceptualization, Methodology, Investigation, Validation, Formal analysis, Writing – Original Draft, Writing – Review & Editing, Visualization, Project administration.

Nancy Carter: Conceptualization, Methodology, Investigation, Validation, Formal analysis, Writing – Original Draft, Writing – Review & Editing, Visualization, Supervision, Project administration.

Samantha Horvath conceived the study and performed the search and data collection. Samantha Horvath & Nancy Carter performed the data screening, extraction, and analysis. Samantha Horvath & Nancy Carter drafted the manuscript and revised critically, reaching consensus on resubmission for publication.

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Appendix A

Search Strategy

Librarian: Laura Banfield
Library: Health Sciences Library, McMaster University
Database: Medline
Data range: 1981 to November 26, 2021
Results: 92

1. emergency nursing/
2. exp nurse/
3. nurs*.mp.
4. or/2-3
5. emergency ward/
6. ((emergency or trauma) adj2 (ward* or department* or room* or unit* or hospital services*)).mp.
7. emergency health service/
8. or/5-7
9. and/4,8
10. or/1,9
11. retention.mp.
12. attrition.mp.
13. turnover.mp.
14. or/11-13
15. leadership/
16. management style/ or hospital management/ or management/ or health care personnel management/ or hospital personnel management/ or personnel management/ or health care management/ or nursing management/
17. leader*.mp
18. administrative personnel/
19. nurse administrator/ or administrator*.mp.
20. management.mp.
21. or/15-20
22. and/10,14,21

Librarian: Laura Banfield
Library: Health Sciences Library, McMaster University
Database: Emcare
Data range: 1995 to November 26, 2021
Results: 94

1. emergency nursing/
2. exp nurse/
3. nurs*.mp.
4. or/2-3
5. emergency ward/
6. ((emergency or trauma) adj2 (ward* or department* or room* or unit* or hospital services*)).mp.
7. emergency health service/
8. or/5-7
9. and/4,8
10. or/1,9
11. retention.mp.
12. attrition.mp.
13. turnover.mp.
14. or/11-13
15. leadership/
16. management style/ or hospital management/ or management/ or health care personnel management/ or hospital personnel management/ or personnel management/ or health care management/ or nursing management/
17. leader*.mp
18. administrative personnel/
19. nurse administrator/ or administrator*.mp.
20. management.mp.
21. or/15-20
22. and/10,14,21

Librarian: Laura Banfield
Library: Health Sciences Library, McMaster University
Database: Embase
Data range: 1996 to November 26, 2021
Results: 203

1. emergency nursing/
2. exp nurse/
3. nurs*.mp.
4. or/2-3
5. emergency ward/
6. ((emergency or trauma) adj2 (ward* or department* or room* or unit* or hospital services*)).mp.
7. emergency health service/
8. or/5-7
9. and/4,8
10. or/1,9
11. retention.mp.
12. attrition.mp.
13. turnover.mp.
14. or/11-13
15. leadership/
16. management style/ or hospital management/ or management/ or health care personnel management/ or hospital personnel management/ or personnel management/ or health care management/ or nursing management/
17. leader*.mp
18. administrative personnel/
19. nurse administrator/ or administrator*.mp.
20. management.mp.
21. or/15-20
22. and/10,14,21

Librarian: Laura Banfield
Library: Health Sciences Library, McMaster University
Database: CINAHL
Data range: 1981 to November 26, 2021
Results: 168

1. (MH "Emergency Nurse Practitioners") OR (MH "Emergency Nursing")
2. (MH "Nurses+")
3. "nurs*"
4. S2 OR S3
5. (MH "Emergency Service")
6. ((emergency or trauma) N2 (ward* or department* or room* or unit* or hospital services*))
7. S5 OR S6
8. S4 AND S7
9. S1 OR S8
10. (MH "Personnel Retention") OR "retention"
11. "attrition"
12. (MH "Personnel Turnover") OR "turnover"
13. S10 OR S11 OR S12
14. (MH "Leadership") OR (MH "Management Styles") OR (MH "Nursing Management") OR (MH "Nurse Managers")
15. Leader or management or administrator*
16. S14 OR S15
17. S9 AND S13 AND S16

Appendix B

MeSH headings

Ex: CINAHL
"Emergency Nursing" "Nurses+" "Emergency Service" "Personnel Turnover" or turnover
"Personnel Retention" or retention "Leadership" or management styles or nursing management
or nurse managers

Appendix C

PRISMA Checklist

Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	attached as abstract
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	4
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	2-5
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	N/A
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	5-6
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	6
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	appendix
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	6,7
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	7
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	6,7
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	7 reported as not assessed
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	7,8

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SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	8
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	8-10
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	N/A
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	10-15
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	15
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	15
Limitations	20	Discuss the limitations of the scoping review process.	16
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	19

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.
* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.
† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).
‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.
§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.

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Perception du personnel infirmier d'urgence quant aux stratégies de leadership et à l'intention de quitter le métier : Une analyse de la documentation

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Résumé

Contexte : Le problème clinique majeur survenant dans les services d'urgence est l'augmentation du taux d'inoccupation en soins infirmiers. Il s'agit d'un problème à multiples facettes, qui peut expliquer pourquoi les infirmières n'ont pas la capacité de faire une longue carrière dans les services d'urgence. Ce thème mérite une attention urgente, car la spécialité est à la croisée des chemins, caractérisée par une augmentation du nombre de présentations et une aggravation de la charge de morbidité. La détermination du problème a un but précis : modifier la pratique actuelle et en apprendre davantage sur le rôle du leader dans cette problématique.

Méthodes : Cet examen narratif a comporté une recherche électronique dans des bases de données, notamment *PubMed*, *Cumulated Index to Nursing and Allied Health Literature* et *Google Scholar*. Des revues à comité de lecture ont été consultées avec les critères de sélection suivants : Langue anglaise, texte intégral, et dates de publication entre 2008 et aujourd'hui. Les termes recherchés étaient les suivants « emergency nurse », « leadership », « emergency nurse retention », « emergency new graduate nurses », « systematic review for emergency nurse retention ».

Résultats: La documentation actuelle sur le sujet examine la question de savoir pourquoi les services d'urgence voient leurs ressources humaines infirmières diminuer régulièrement. L'un des principaux facteurs qui influencent cet épuisement est l'environnement de travail (des niveaux élevés de stress professionnel, de frustrations et de violence horizontale entre infirmier et infirmière sont à l'origine d'environnements toxiques et à haute pression). Jumelé au manque de personnel, les mauvais ratios infirmières/patients et le moral bas des infirmières, on obtient un cercle vicieux de baisse de la satisfaction professionnelle.

Discussion : Les stratégies visant à atténuer les taux d'attrition du personnel infirmier d'urgence exigent une gestion et un leadership rigoureux. Dans le cadre de l'étude de la relation entre le leadership authentique et la profession infirmière, l'accent est mis sur l'honnêteté, l'intégrité, les normes éthiques élevées et un modèle de rôle

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positif. Un leadership visible et des actions pédagogiques au moment du recrutement font partie de ces stratégies qui favorisent le maintien et le développement du personnel infirmier des urgences. Si cette problématique n'est pas résolue, les services d'urgence du monde entier continueront à exercer leurs activités en dépit d'un déficit dangereux en personnel infirmier compétent.

Introduction

Le maintien du personnel infirmier autorisé (IA) en milieu de travail est un problème de ressources humaines dans le domaine de la santé à l'échelle mondiale, que la pandémie de COVID n'a fait qu'exacerber (Virkstis et coll., 2022). Le maintien d'une main-d'œuvre infirmière stable est primordial, en plus de répondre à une multitude de problèmes auxquels sont confrontés les responsables des soins de santé pendant cette période. La pandémie a eu un impact immense sur le bien-être psychologique des infirmières de première ligne, leur qualité de vie au travail (An et coll., 2020) et leur intention de quitter les services de soins intensifs, y compris les services d'urgence (Cornish et coll., 2021).

La spécialité des urgences est caractérisée par un faible taux de maintien en poste des infirmières autorisées et un taux de roulement de plus en plus élevé (Sawatzky et Enns, 2012). De 2011 à 2020, au Canada, le nombre d'infirmières et d'infirmiers inscrits à la CSU(C) (certification en soins infirmiers d'urgence au Canada) a diminué de 1331 à 884 (ICIS, 2021). Il y a de nombreuses raisons à cette diminution de la spécialisation, notamment un stress accru dû à l'augmentation du nombre de patients et à la pénurie de personnel infirmier. Le personnel infirmier des services d'urgence est également vulnérable à des facteurs de stress tels que l'exposition à des incidents traumatisants, des taux de violence plus élevés, la participation à des décisions de vie ou de mort, ainsi que des conditions de travail agitées et changeantes (ratios patients/infirmière, imprévisibilité de l'état des patients) (Adriaenssens et coll., 2011 ; Sawatzky et Enns, 2012).

Contexte

L'Organisation mondiale de la santé [OMS, 2022] définit les soins d'urgence dans le monde entier, comme le premier point de contact avec le système de soins de santé pour plusieurs patients. L'American College of Emergency Physicians [ACEP], 2021, définit les services d'urgence comme la prestation d'une évaluation et d'un traitement de toute condition médicale pouvant nécessiter des soins médicaux immédiats et imprévus. Le personnel infirmier d'urgence comprend les services infirmiers professionnels qui travaillent au sein du service ou de l'unité pour faciliter la prise en charge du patient. Le champ d'application des activités du personnel infirmier d'urgence comprend un ensemble de connaissances et de compétences spécialisées, mais ne se limite pas au triage et à la hiérarchisation des soins aux patients, à la stabilisation et à la réanimation, aux interventions en cas de crise, à la préparation aux catastrophes, à l'éducation des patients et à la prévention des maladies et des blessures (Association Nationale des Infirmières et Infirmiers d'urgence [ANIIU] 2018).

Le leadership au sein des urgences offre une structure supplémentaire aux services infirmiers. Diverses définitions du leadership existent et, dans le contexte des soins infirmiers, il peut être décrit comme suit : Fournir une vision ou une direction à l'équipe, ainsi que le processus d'influence des actions du groupe vers un objectif ou une réalisation commune (Collins et coll., 2019). Les « stratégies de leadership » sont un concept décrivant des propositions claires pour les réalisations des leaders afin d'assurer la réussite des objectifs clés des organisations (Centre for Creative Leadership [CCL], 2022). Les stratégies de leadership rassemblent typiquement différentes compétences, caractéristiques et comportements attendus des responsables, ainsi que certaines capacités qui peuvent susciter l'engagement des employés et créer une culture de leadership souhaitable (CCL, 2022). Par exemple, les comportements de leadership qui ont été indiqués comme ayant une influence positive sur la fidélité du personnel infirmier sont une grande visibilité dans le service, le soutien du personnel et le partage des responsabilités de leadership ; l'éducation supérieure et la formation au leadership ; ces derniers se sont avérés favorables à l'assimilation de comportements de leadership efficaces (Kleinman, 2004).

Les différents styles de leadership qui peuvent aider à concrétiser ces stratégies et comportements sont la gestion participative (Volk et Lucas, 1991), le leadership transformationnel (Dunham-Taylor, 2000) et les styles de leadership authentique (Gardner et coll., 2005).

Le taux de roulement est défini comme le taux auquel une organisation perd ses employés. La satisfaction au travail est le facteur le plus important qui l'influence (Lavoie-Tremblay et coll., 2019). L'intention de démissionner est la perception qu'a une infirmière ou un infirmier de son intention de quitter la profession et elle est directement liée à la satisfaction au travail (Lavoie-Tremblay et coll., 2019). Le maintien en poste est l'effet combiné des stratégies visant à réduire le taux de roulement et l'intention de quitter la profession infirmière, ce qui permet aux infirmières de poursuivre leur travail. Au Canada, le roulement du personnel est onéreux. Le coût estimatif du remplacement d'une infirmière spécialisée varie d'une organisation à l'autre. Les coûts directs encourus par le système de santé canadien (le processus d'embauche) ont été estimés à 64 000 dollars canadiens il y a plus de dix ans (O'Brien-Pallas et coll., 2010), tandis que les coûts indirects (baisse du moral du groupe et perte de productivité) peuvent faire grimper le total beaucoup plus haut.

Les interventions visant à accroître le maintien en poste du personnel infirmier d'urgence ont été examinées. Les facteurs ayant une incidence sur ce maintien en poste varient de l'infirmière nouvellement diplômée à l'expert clinique chevronné (Valdez, 2008). Plusieurs interventions ne sont pas sous le contrôle de l'individu. L'amélioration de l'environnement de travail et le soutien des leaders peuvent influer sur les coûts de roulement du personnel infirmier des urgences, mais on ne s'entend pas sur une stratégie spécifique à adopter (Gorman, 2018). Certaines recherches établissent un lien entre le style de leadership et les conditions de travail du personnel infirmier. En effet, de nombreuses études révèlent les effets positifs d'une stratégie de leadership authentique au sein de la profession infirmière (Lee et coll., 2018 ; Maziero et

coll., 2020; Ribeiro do Valle et coll., 2020; Yasinki, 2014). Une analyse des études sur les soins intensifs indique que les leaders qui font preuve d'un leadership bienveillant, transformationnel et exemplaire influencent les infirmières à demeurer en poste et la satisfaction au travail (Kiwanuka et coll. 2021). La recherche qui confirme que le leadership est un indicateur clé du maintien en poste du personnel infirmier a sensibilisé le public (l'Association des infirmières et infirmiers autorisés de l'Ontario [AIIO], 2013), mais certaines lacunes subsistent dans la documentation quant aux stratégies les plus efficaces pour prévenir un roulement élevé, en particulier dans les services d'urgence.

But et objectifs

La présente étude de portée vise à faire une analyse documentaire et une synthèse de l'état actuel des connaissances internationales (en langue anglaise) sur les stratégies de leadership utilisées dans les services d'urgence pour favoriser le maintien en poste du personnel infirmier. L'objectif est de déterminer si les gestionnaires des services d'urgence emploient des stratégies de leadership et si ces stratégies ont une incidence sur : 1) le maintien en poste du personnel infirmier, 2) l'intention de rester, 3) l'intention de partir, ou 4) le roulement du personnel. Les questions de recherche sont les suivantes : 1) Quelles stratégies de leadership sont utilisées par les gestionnaires des services d'urgence pour favoriser le maintien en poste du personnel infirmier ? 2) Parmi ces stratégies de leadership, certaines ont-elles un impact sur le maintien du personnel infirmier, l'intention de rester, l'intention de partir ou le roulement du personnel ? Nous avons choisi d'effectuer une revue de la portée puisqu'elle permet de synthétiser divers modèles d'études utiles pour les programmes et les politiques (Colquhoun et coll., 2014). Conformément aux méthodes de l'examen de la portée, aucune évaluation méthodologique de la qualité des études incluses n'a été effectuée, étant donné que notre objectif n'était pas seulement d'étudier les résultats en matière de maintien en poste et de roulement du personnel infirmier, mais aussi d'en apprendre davantage sur les stratégies de leadership. Lors d'une première consultation de la documentation, nous avons trouvé très peu d'articles portant sur les stratégies de leadership dans le domaine de l'urgence. De surcroît, aucune revue systématique ou de portée actuelle ou en cours sur ce sujet n'a été identifiée.

Méthodes

Stratégie de recherche

Pour orienter cette étude en cinq étapes, nous avons utilisé la méthodologie révisée de Levac et coll. (2010) d'Arksey et O'Malley (2005) : (1) détermination de la question de recherche ; (2) identification des études pertinentes ; (3) sélection des études ; (4) représentation graphique des données ; et (5) rassemblement, résumé et présentation des résultats. La méthode de recherche adoptée pour cette étude était axée sur trois concepts clés : les soins infirmiers d'urgence, le leadership et le maintien en poste/le roulement du personnel. Afin d'être sélectionnés, les articles devaient être publiés en anglais, être issus de la recherche primaire (tout modèle d'étude), être publiés en 2010 ou après afin de se concentrer sur les recherches récentes et inclure tous les concepts clés : maintien en poste des infirmières d'urgence par rapport au leadership. Avec l'aide d'un bibliothécaire universitaire spécialisé dans les sciences de la santé, une recherche approfondie a été effectuée dans les bases de données *Cumulative Index to Nursing and Allied Health Literature* (CINAHL), EMCARE, EMBASE et MEDLINE en réalisant quatre recherches distinctes le 26 novembre 2021. Des recherches ont également été effectuées dans la littérature grise, notamment dans *ProQuest Dissertations & Theses*, Thèses Canada, *Australasian Digital Thesis Program*, *Electronic Theses Online Service (EthOS)*, *OpenGrey* et une recherche modifiée de *Google Scholar*. Les rubriques et les mots clés ont été employés pour trouver des articles décrivant le maintien en poste des infirmières d'urgence en relation avec le leadership. La première recherche n'a pas été limitée par la date, l'âge ou la zone géographique afin d'augmenter la quantité de résultats (voir l'annexe pour la stratégie de recherche).

Raffinement des études pertinentes

Les critères retenus pour l'inclusion dans la revue sont les suivants : articles publiés en anglais et entre 2010 et novembre 2021, disponibilité du texte intégral, articles publiés, non publiés ou descriptifs utilisant tout modèle de recherche (par exemple : expérimental, quasi-expérimental, essais contrôlés randomisés, méta-analyses, revues de littérature, études de cas, etc.). De plus, les critères doivent avoir inclus les éléments suivants : les infirmières travaillant dans les services d'urgence, le leadership ou les stratégies de leadership, et le maintien en poste, l'intention de rester, l'intention de partir ou le roulement. Les critères d'exclusion comprenaient tout article publié dans une langue autre que l'anglais et avant 2010, les articles comprenant des éditoriaux, des commentaires, des revues ou des critiques de livres, les articles qui ne décrivaient pas une stratégie de leadership, qui ne fournissaient pas d'informations sur le maintien en poste du personnel, l'intention de rester, l'intention de partir ou le roulement, ou dont les résultats étaient ambigus (par exemple si les données précises sur les infirmières d'urgence n'étaient pas disponibles).

Conformément aux méthodes d'examen de la portée, aucune évaluation de la qualité n'a été effectuée sur les articles sélectionnés. À la suite de la recherche, toutes les citations identifiées ont été téléchargées dans Covidence (Veritas Health Innovation, Melbourne, Australie), et tous les doublons ont été supprimés.

Inclusion des études

La vérification du titre et du résumé a été effectuée par les deux auteurs à l'aide de Rayyan, l'application web et mobile pour les revues systématiques (Ouzzani, 2016). Les conflits ont été résolus au moyen d'une discussion et d'un consensus entre les deux auteurs. La vérification du texte intégral et l'extraction des données ont été effectuées à l'aide du logiciel d'examen systématique Covidence (Veritas Health Innovation, 2021). Pour en assurer la validité, le modèle d'extraction des données a été créé par les deux auteurs et testé sur trois études. Après vérification des tests, les divergences ont été résolues par des communications virtuelles et par courrier électronique entre les deux auteurs. On a confié le reste des articles à chaque auteur pour qu'il les examine et en extraie les données à l'aide du modèle.

Répertorier les données

Les données recueillies portaient sur des détails précis concernant la population, le concept, le contexte, les méthodes d'étude et les principales conclusions relatives à l'objectif de l'examen. Les données tirées des articles inclus ont été téléchargées dans un fichier Excel, examinées par chaque auteur, puis discutées ensemble pour repérer les stratégies de leadership.

Résultats

Résultats de la stratégie de recherche

Les résultats de la sélection et le rendement global des articles sont présentés dans l'organigramme PRISMA de la figure 1. Les doublons ayant été supprimés, 349 articles ont été sélectionnés en examinant les titres et les résumés ; 326 étaient hors sujet, hors période de validité ou non rédigés en anglais. En tout, 23 articles en texte intégral ont été évalués. Quatorze d'entre eux ont été exclus parce qu'ils ne traitaient pas du maintien en poste du personnel, de l'intention de rester, de l'intention de partir ou des résultats du roulement du personnel en relation avec le leadership. Enfin, si nous n'avons pas été en mesure d'extraire des résultats propres aux infirmières d'urgence ou au contexte des urgences, l'article a été exclu.

Numéros, sources et types de documents

Parmi les neuf articles inclus dans l'examen, huit étaient de type quantitatif. Quatre d'entre elles ont été réalisées en Europe (Adriaenssens et coll., 2011 ; Adriaenssens et coll., 2015 ; Bruyneel et coll., 2017, et deWijn et coll., 2021), trois en Amérique du Nord (Adams et coll., 2019 ; Baker, 2016 ; et Sawatzky et Enns, 2012) et une en Asie (Yen-JuLin et coll., 2012). Il y a eu une étude qualitative provenant de l'Ouest canadien (Van Osch et coll., 2018).

Aperçu des articles

Ci-dessous, nous décrivons les études plus en détail et nos résultats sont organisés en fonction des objectifs de notre étude. Dans un premier temps, nous décrivons les stratégies de leadership déclarées, puis nous décrivons leur impact sur l'intention de quitter le domaine et le taux de roulement.

Stratégies de leadership au sein du service d'urgence

La plupart des publications que nous avons identifiées traitent de la perception des infirmières en matière de leadership dans le cadre d'études transversales. Parmi les stratégies figurent le soutien social, l'engagement et la culture organisationnelle.

Soutien social du superviseur

La stratégie de leadership la plus fréquemment citée est le soutien social des superviseurs. Un ensemble de quatre articles, dont trois provenant de Belgique (Adriaenssens et coll., 2011 ; Adriaenssens et coll., 2015 ; Bruyneel et coll., 2017) et un des Pays-Bas (deWijn et coll., 2021), a utilisé le questionnaire de Leiden sur la qualité du travail des infirmières [LQWQ-N] (Gelsema et coll., 2007). L'instrument LQWQ-N est composé de sous-échelles servant à mesurer les caractéristiques de l'emploi et de l'organisation, ainsi que des variables de résultat (satisfaction au travail et intention de roulement). La dimension du soutien social est le seul aspect des caractéristiques de l'emploi directement lié au leadership. Dans l'instrument LQWQ-N, cela se présente comme « Je me sens apprécié par mon superviseur ».

Adriaenssens et ses collègues (2011) ont tenté de comparer les infirmières d'urgence à d'autres infirmières afin de déterminer s'il existait une distinction en termes de caractéristiques professionnelles et de facteurs organisationnels et de comprendre dans quelle mesure ceux-ci permettent de prévoir la satisfaction au travail, l'intention de roulement et l'engagement au travail chez les infirmières d'urgence. Au total, 254 membres du personnel infirmier de 15 services d'urgence ont participé à l'étude. Selon les auteurs, l'intention de roulement n'a pas été considérée comme ayant un effet important du point de vue statistique sur le soutien social du superviseur, un sous-ensemble énuméré dans les caractéristiques du travail.

Dans le cadre d'une autre étude longitudinale, Adriaenssens et ses collègues (2015) ont tenté de comprendre le degré auquel les changements dans les caractéristiques de l'emploi et les facteurs organisationnels peuvent prédire les résultats de la détresse (y compris la satisfaction au travail, l'intention de roulement et l'engagement au travail). Ils ont utilisé le LQWQ-N dans le cadre d'une étude en deux volets, avec un intervalle de 18 mois entre la première et la deuxième évaluation. Parmi les 254 infirmières, 204 travaillaient toujours dans le même service d'urgence 18 mois plus tard, ce qui indique un taux de roulement de 19,7 % sur 18 mois. On n'a pas trouvé de corrélation directe entre les variables de soutien au contrôle de la demande d'emploi utilisée dans l'outil LQWQ-N et l'intention de quitter le domaine. La somme des scores pour le « soutien du superviseur » et le « soutien des collègues » a été combinée dans cette étude comme une mesure globale du soutien, contrairement aux autres études où elle a été rapportée comme un facteur séparé.

Bruyneel et coll. (2017) ont ensuite recouru à l'outil LQWQ-N pour examiner les associations entre les facteurs structurels, les caractéristiques démographiques et le parcours du bien-être des infirmières (y compris la satisfaction au travail, l'épuisement professionnel et l'intention de roulement). On a évalué la qualité de l'environnement de travail à l'aide de l'échelle PES-NWI (Practice Environment Scale of the Nursing Work Index) (Lake, 2002). L'enquête transversale multicentrique a porté sur 294 infirmières travaillant dans onze services d'urgence. Selon les constatations, la gestion et le leadership des infirmières, ainsi que le soutien social du superviseur, ont un effet statistiquement significatif sur la satisfaction au travail, mais pas sur l'intention de roulement. Cependant, lorsque la médiation est modérée (modèle des effets indirects conditionnels), l'effet indirect du soutien social du superviseur et de la satisfaction au travail sur l'intention de roulement n'est alors présent et significatif que pour les infirmières des urgences participant à l'étude.

DeWijn et coll. (2021) ont pour leur part employé l'outil LQWQ-N pour évaluer la satisfaction au travail et l'intention de roulement dans le cadre d'une plus grande étude transversale. Ils ont reçu des réponses à l'enquête de 701 membres du personnel infirmier d'urgence. Cette enquête avait pour but de déterminer les conséquences du stress et le bien-être professionnel des infirmières d'urgence aux Pays-Bas, et d'identifier les demandes et les ressources qui permettent le mieux de prédire le bien-être des employés. Dans l'ensemble, les infirmières d'urgence ont obtenu des résultats plus élevés en matière de stress que l'échantillon représentatif de la population active en général. Les variantes du questionnaire, telles que la dotation en personnel et le soutien social du superviseur, ont également contribué de manière significative à de légers changements dans l'engagement au travail, mais bien moins que les possibilités de perfectionnement. L'étude a révélé qu'un tiers du personnel infirmier envisage de quitter son emploi à l'hôpital dans les trois prochaines années.

En somme, ces quatre études publiées ont été menées à l'aide du même outil LQWQ-N et ont examiné l'intention de roulement de plus de 1 400 infirmières d'urgence en relation avec le soutien social du superviseur. Aucune relation directe ni aucune signification statistique n'ont été trouvées.

Engagement des dirigeants

Dans deux articles, les chercheurs ont examiné la relation entre l'engagement du leadership et l'intention de démissionner à l'aide de modèles d'enquête (Baker, 2016 ; Sawatzky et Enns, 2012).

Baker (2016) a analysé les éléments qui influencent le maintien en poste des infirmières des services d'urgence et leur intention de démissionner. L'étude s'est appuyée sur le modèle de leadership transformationnel selon Bass (Bass et coll., 2003) et sur l'engagement au travail décrit par Schaufeli et Bakker (2004). Un sondage a été élaboré, dans lequel figuraient des questions sur le style transformationnel tirées du Multifactor Leadership Questionnaire [MLQ] (Bass et Avolio, 1990), des éléments de l'instrument Perceived Nursing Work Environment [PNWE] (Choi et coll., 2004) et l'échelle Turnover Intention Scale (Mobley et coll., 1978). Il a été distribué à un total de 100 infirmières d'urgence certifiées aux États-Unis. Le questionnaire MLQ regroupe 20 questions portant sur l'inspiration, la motivation rationnelle et le comportement d'attention personnalisée afin de déterminer le style de leadership. Pour sa part, l'instrument PNWE reposait sur les éléments suivants : gestion des soins infirmiers, pratique professionnelle, collaboration infirmière/médecin, ressources en personnel et le travail par quart. Les résultats révèlent qu'il n'y a aucune importance statistique entre le leadership transformationnel et les scores d'intention de roulement ni aucune différence statistique entre les stratégies d'engagement des infirmières gestionnaires et les scores d'intention de roulement.

Pour définir les facteurs qui prédisent l'intention des infirmières d'urgence de quitter leur poste, Sawatzky et Enns (2012) ont utilisé un plan d'étude transversal. Un questionnaire portant sur l'environnement de travail et la qualité de vie professionnelle a été rempli par 261 membres du personnel infirmier travaillant dans douze services d'urgence pour adultes au Manitoba, au Canada. Ils ont également fait part de leur intention de quitter leur emploi. Plus d'un quart (26 %) des répondants ont déclaré qu'ils quitteraient « probablement » ou « certainement » leur poste au service d'urgence au cours de l'année suivante. L'un des principaux facteurs prédictifs de l'abandon du poste actuel est la diminution de l'engagement (la gestion des soins infirmiers étant un facteur d'influence de l'engagement).

Culture de l'organisation

Évaluation de la culture organisationnelle

Un article rédigé par Yen-Ju Lin et ses collaborateurs (2012) a utilisé un modèle d'enquête transversale pour étudier les divers effets culturels sur la satisfaction au travail et l'intention de partir chez les médecins et le personnel infirmier des urgences à Taïwan. Deux cent trente-quatre infirmières et 208 médecins ont répondu à l'enquête dans 119 hôpitaux. Un questionnaire destiné à évaluer la satisfaction des employés ainsi que l'instrument d'évaluation de la culture organisationnelle (OCAI) ont été mis en place. L'OCAI est un outil permettant de mesurer quatre types de cultures dans les services d'urgence hospitaliers (clan, adhocratie, hiérarchie et marché) et ceux-ci ont été examinés afin de déterminer s'il existe un lien avec l'intention des infirmières de quitter l'hôpital. L'OCAI a été modifié par les auteurs pour couvrir six dimensions, dont les caractéristiques dominantes, le leadership, la gestion des employés, la colle organisationnelle, les axes stratégiques et les critères de réussite (Yen-Ju Lin et coll., 2012). Contrairement aux médecins, les infirmières se sont déclarées moins satisfaites de la direction, de la gestion des urgences et des politiques de l'hôpital, mais aucune différence statistiquement significative n'a été constatée entre les deux groupes en ce qui concerne l'intention de démissionner. La culture ne semblait pas influencer l'intention de démissionner.

Mise en œuvre d'une boîte à outils pour le changement culturel

Un article a décrit l'évaluation d'un programme de stratégies de leadership visant à réduire l'épuisement professionnel et le roulement du personnel infirmier en améliorant la perception de l'environnement de pratique (Adams et coll., 2019). Les auteurs ont élaboré et mis en œuvre une « boîte à outils pour le changement culturel » au sein d'un service d'urgence communautaire doté de 41 lits dans le sud-est du Texas. Les initiatives en matière de leadership prévoyaient le partage du processus décisionnel, des stratégies de reconnaissance significatives, des tournées quotidiennes des chefs, des tableaux de gratitude adaptés à chaque service, des cartes de remerciement pour le personnel et les chefs, et une rétroaction du personnel ajoutée aux réunions quotidiennes des services d'urgence. Pour mesurer l'épuisement professionnel et le roulement anticipé, on a utilisé l'échelle *Anticipated Turnover Scale* (Hinshaw et Atwood, 1982, cités dans Adams, 2019) et l'Inventaire d'épuisement professionnel d'Oldenburg (Demerouti et coll., 2002) pour les 30 infirmières des services d'urgence participantes. Les résultats ont fait état d'une réduction du taux moyen de roulement anticipé, mais cette réduction n'était pas très significative sur le plan statistique. Le tableau 1 présente les données relatives aux huit études quantitatives et l'impact qu'elles ont eu sur l'intention de démissionner ou sur le roulement du personnel.

Le leadership selon les infirmières

Une étude qualitative dans l'ouest du Canada Van Osch et ses collègues (2018), ont employé une conception descriptive interprétative pour examiner les facteurs d'influence et les stratégies qui peuvent promouvoir l'intention d'une infirmière chevronnée de rester dans son secteur d'urgence ou de soins intensifs. L'étude a porté sur dix infirmières des urgences, ainsi que sur une infirmière qui travaillait à la fois aux urgences et aux soins intensifs. On a organisé des groupes de discussion pour recueillir des informations sur les facteurs qui favorisent la poursuite de l'emploi dans le même département et sur les stratégies soit de l'unité soit de l'employeur qui ont pu influencer le maintien dans le département. Parmi les traits de leadership appréciés par les participants figurait le fait d'être accessible, de s'engager activement dans l'unité et de faire preuve de compétences de communication claires en définissant des attentes précises. Ces caractéristiques des leaders de l'unité représentent la majorité des raisons pour lesquelles les participants sont demeurés dans

Tableau 1

Incidence des stratégies de leadership sur l'intention de démissionner ou le roulement du personnel

Stratégie de leadership	Article	Effet déclaré sur l'intention de démissionner ou sur le roulement du personnel
Soutien social de la part du superviseur	Adriaenssens et coll., 2011	Aucun effet significatif
	Adriaenssens et coll., 2015	Pas de lien direct
	Bruyneel et coll., 2017	Effet indirect pour les infirmières
	deWijn et coll., 2021	Aucun effet significatif
Implication	Baker, 2016	Aucun effet significatif
	Sawatzky et Enns, 2012	Les prédicteurs intermédiaires significatifs de l'intention de quitter le poste actuel comprennent un engagement moindre (la gestion des soins infirmiers à une influence sur l'engagement)
Culture de l'organisation	Adams et coll., 2019	Aucun effet significatif
	Yen-JuLin et coll., 2012	Aucun effet de la culture sur la volonté des infirmières des services d'urgence de quitter leur emploi n'a été constaté

leur poste actuel. Les leaders qui ont influencé ces résultats sont les gestionnaires, les éducateurs et les infirmières en chef.

Pour conclure, les articles inclus dans cette étude exploratoire ont examiné une variété de stratégies de leadership et leur lien avec l'intention de démissionner et le roulement du personnel infirmier des urgences. Nous avons constaté qu'aucune stratégie ou activité de leadership cohérente n'influençait l'intention du personnel infirmier d'urgence de démissionner ou le roulement du personnel. Tous sauf un les articles inclus étaient de nature quantitative et reposaient principalement sur l'observation. Un article axé sur la mise en œuvre et l'évaluation du programme (Adams et coll., 2019) a révélé une réduction du roulement anticipé, mais il s'agissait d'une petite étude et les résultats n'étaient pas statistiquement significatifs.

Discussion

Le maintien en poste du personnel infirmier d'urgence et la prévention du roulement sont des questions à caractère multidimensionnel qui découlent de plusieurs facteurs qui peuvent être difficiles à contrôler en raison de la nature du contexte. Toutefois, les gestionnaires peuvent tenter différentes approches et apporter leur soutien au personnel pour améliorer la qualité de vie et l'environnement de travail. La présente étude de portée a analysé la documentation et résumé les résultats afin de comprendre si des stratégies de leadership précises appliquées dans les services d'urgence ont des liens avec le maintien en poste du personnel infirmier, l'intention de rester, l'intention de démissionner ou le roulement du personnel. Nos conclusions fournissent des résultats décrivant la perception des infirmières quant aux stratégies de leadership et leur intention de partir, mais on en connaît peu sur l'impact de stratégies précises.

Limitations

La documentation portant sur les infirmières d'urgence et les stratégies de leadership est limitée et est principalement constituée de modèles d'observation. Une compréhension plus théorique des variables a été obtenue par l'utilisation d'enquêtes transversales, y compris des outils établis tels que le LQWQ-N, mais la description de la composante leadership dans ces études était insuffisante. Les interventions peu détaillées, telles que l'appréciation ou le soutien par le superviseur, contiennent peu d'informations sur les interventions et ne permettent pas la reproduction de l'étude ou la méta-analyse des résultats (Monsen, 2018.). La rubrique « Je me sens apprécié par mon superviseur » est un élément de la sous-échelle « Caractéristiques de l'organisation » du LQWQ-N. Un élargissement éventuel de cette variable ou l'exploration de ce que signifie le concept d'appréciation du superviseur est important pour les futures recherches et l'application réelle sur le terrain.

Implications pour la recherche ultérieure

Il semble y avoir une possibilité d'accroître les études expérimentales, qualitatives et de mise en œuvre de programmes qui étudient les stratégies de leadership pour le maintien en poste du personnel infirmier d'urgence. Les articles qui ont fourni les informations les plus pratiques et détaillées à l'usage des gestionnaires étaient une évaluation de programme des stratégies de leadership (Adams et coll., 2019) et une étude qualitative sur le maintien en poste du personnel infirmier d'urgence (Van Osch et coll., 2018). Les stratégies employées dans l'étude d'évaluation du programme furent des activités simples telles que la reconnaissance des infirmières, les cartes de remerciement et la rétroaction quotidienne aux infirmières. Ces stratégies ne sont ni difficiles ni coûteuses, mais elles exigent la présence du leader dans l'unité et l'engagement du personnel au quotidien. Interrogés sur leur intention de rester au service des urgences, les infirmiers et infirmières d'urgence canadiens ont déclaré que l'accessibilité et l'engagement actif dans l'unité sont des caractéristiques appréciées chez les leaders (Van Osch et coll., 2018). Cependant, compte tenu des budgets hospitaliers serrés et de l'aplatissement des structures organisationnelles, l'engagement des gestionnaires ou des directeurs et leur accessibilité ne représentent pas une solution simple. Une prochaine étape importante serait d'imaginer qui sont les infirmières leaders accessibles et engagées dans les services d'urgence.

Les études canadiennes ont été examinées en ce qui concerne le maintien ou le roulement du personnel infirmier d'urgence et les stratégies de leadership. Nous n'avons identifié que deux études

pertinentes depuis 2010 au Canada portant exclusivement sur les infirmières et infirmiers d'urgence dans le contexte des services d'urgence, et ce, malgré plusieurs programmes de recherche canadiens dirigés par des infirmières et infirmiers et axés sur le leadership et ses résultats (Boamah et coll., 2018 ; Laschinger et coll., 2009 ; Wong et coll., 2013). Cela dit, des organismes canadiens de soins infirmiers ont élaboré des ressources à l'intention des dirigeants afin de promouvoir le maintien en poste du personnel infirmier. L'AIIO préconise le leadership transformationnel (AIIO, 2017) pour assurer un milieu de travail favorable et pour contribuer largement à une culture de travail forte. Les Lignes directrices de l'AIIO sur le développement et le maintien du leadership infirmier (2013), proposent que les facteurs organisationnels et systémiques soient déterminants pour un environnement de travail sain pour le personnel infirmier. Les principales stratégies fondées sur des données probantes consistent notamment à établir des relations et à instaurer la confiance, à créer un environnement de travail responsabilisant, à apporter un soutien à l'organisation qui valorise le rôle essentiel du personnel infirmier, à créer une culture à partir de ses propres ressources personnelles (résilience, éducation et expertise) et de son identité professionnelle (AIIO, 2013). L'AIIC et la Fédération canadienne des syndicats d'infirmières et d'infirmiers (FCSII) ont mis en place une trousse d'outils fondée sur des données probantes qui recommandent des facteurs organisationnels et des indicateurs de résultats qui reposent sur le soutien et l'engagement du leadership pour le personnel (AIIC et FCSII, 2015). L'AIIC et la FCSII ont lancé un projet pilote intitulé « De la recherche à l'action », qui a été mis en œuvre partout au Canada. Ce projet présente des stratégies novatrices visant à favoriser un environnement de travail sain et positif et à renforcer le leadership (Silas, 2012).

Conséquences pour la pratique

Le rôle que peuvent jouer les infirmières responsables d'unité, les infirmières spécialisées et les infirmières de pratique avancée pour favoriser un environnement de travail sain pour les infirmières dans les services d'urgence mérite d'être étudié. Selon une étude australienne sur le rôle de l'IP au sein des services d'urgence, les infirmières ont indiqué que l'IP était inspirante et servait de modèle (Li et coll., 2013). Les rôles d'infirmières cliniciennes spécialisées comprennent généralement des composantes de leadership, d'éducation et de recherche en plus de la pratique clinique (Kilpatrick et coll., 2014) et on a signalé leur application aux services d'urgence pour desservir de divers groupes de patients (Leary et Baxter, 2014 ; Mullennix et coll., 2020 ; Baldwin et coll.). La chute du nombre d'infirmières canadiennes qui conservent leur certification de spécialité en soins d'urgence par l'Association des infirmières et infirmiers du Canada (AIIC) est préoccupante (ICIS, 2021). La certification de la spécialité infirmière a des répercussions à la fois sur les organismes et sur les soins aux patients, et est associée à une réduction du taux de roulement (Straka et coll., 2014).

Pour favoriser le maintien en poste du personnel infirmier sur le plan du leadership, il faut promouvoir activement des environnements de travail sains et sécuritaires. Bien que le manque de personnel entraîne une baisse du maintien dans la profession, un environnement de travail sain peut contribuer à atténuer ce problème. Lavoie-Tremblay et coll. (2019) définissent un environnement de travail sain comme une idée complexe, où les gestionnaires permettent aux infirmières de s'engager dans des processus de travail munis de structures, de pratiques et de politiques essentielles à la promotion du bien-être de la profession. L'American Association of Critical-Care Nurses [AACN] (2019) fait état de six normes fondées sur des données probantes pour assurer un environnement de travail sain : une qualité de communication, une véritable collaboration, une prise de décision efficace, une dotation en personnel adéquate, une véritable reconnaissance et un leadership authentique.

Étant donné qu'aucune stratégie de leadership direct n'a été identifiée pour améliorer le maintien en poste des infirmières d'urgence et leur intention à y demeurer, les leaders pourraient avoir besoin de nouvelles stratégies de gestion. Selon les prévisions, les services d'urgence canadiens verront le volume et l'acuité des patients augmenter de façon exponentielle à la suite de la pandémie. En plus du stress élevé lié à l'environnement de travail que subissent les infirmières d'urgence, le roulement continu et l'intention de plus en plus marquée, de quitter le travail s'avérera un problème flagrant. Il sera essentiel que le département des urgences envisage des stratégies de leadership précises afin d'atténuer le roulement du personnel infirmier.

Implications pour la pratique clinique des urgences

- Pour favoriser le maintien en poste du personnel infirmier, la promotion active de la santé et d'un environnement de travail sécuritaire est une stratégie que les gestionnaires des services d'urgence peuvent adopter.
- Toutes les infirmières, y compris les infirmières responsables, les infirmières spécialisées et les infirmières de pratique avancée, jouent un rôle dans la promotion d'un environnement de travail sain et favorable à l'équipe infirmière.
- Il existe des lignes directrices sur les pratiques exemplaires élaborées par des organismes canadiens de soins infirmiers. Elles représentent une stratégie pour les services d'urgence à la recherche de données probantes pour créer et maintenir un leadership au sein des services d'urgence.

Les auteures

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Conflits d'intérêts

« En tant qu'auteure correspondante, je déclare par la présente que nous, l'équipe d'auteurs, n'avons aucun conflit d'intérêts à déclarer en rapport avec ce manuscrit et que ce travail n'est pas subventionné. »

Contributions de l'équipe de rédaction et déclaration de l'auteur CRedIT

Samantha Horvath : Conceptualisation, méthodologie, Enquête, Validation, Analyse formelle, Rédaction de l'ébauche, Rédaction et Révision, Visualisation, Administration du projet.

Nancy Carter : Conceptualisation, méthodologie, Enquête, Validation, Analyse formelle, Rédaction de l'ébauche, Rédaction et Révision, Visualisation, Supervision, Administration du projet.

Samantha Horvath a conçu l'étude et a effectué la recherche et la collecte des données. Samantha Horvath et Nancy Carter ont effectué le tri, l'extraction et l'analyse des données. Le manuscrit a été rédigé par les deux auteures et a fait l'objet d'une révision critique, permettant d'aboutir à un consensus sur la présentation de la nouvelle version pour publication.

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Annexe A

Stratégie de recherche

Bibliothécaire : Laura Banfield
Bibliothèque : Sciences de la santé chez McMaster University
Base de données : Medline
Intervalle de données: 1981 au 26 novembre 2021
Résultats: 92

1. emergency nursing/
2. exp nurse/
3. nurs*.mp.
4. ou/2-3
5. emergency ward/
6. ((emergency or trauma) adj2 (ward* ou department* ur room* ou unit* ou hospital services*)).mp.
7. emergency health service/
8. ou/5-7
9. et/4,8
10. ou/1,9
11. retention.mp.
12. attrition.mp.
13. turnover.mp.
14. ou/11-13
15. leadership/
16. management style/ ou hospital management/ ou management/ ou health care personnel management/ ou hospital personnel management/ ou personnel management/ ou health care management/ ou nursing management/
17. leader*.mp
18. administrative personnel/
19. nurse administrator/ ou administrator*.mp.
20. management.mp.
21. ou/15-20
22. et/10,14,21

Bibliothécaire: Laura Banfield
Bibliothèque: Health Sciences Library, McMaster University
Base de données: Emcare
Intervalle de données: 1995 au 26 novembre 2021
Résultats: 94

1. emergency nursing/
2. exp nurse/
3. nurs*.mp.
4. ou/2-3
5. emergency ward/
6. ((emergency ou trauma) adj2 (ward* ou department* ou room* ou unit* ou hospital services*)).mp.
7. emergency health service/
8. ou/5-7
9. et/4,8
10. ou/1,9
11. retention.mp.
12. attrition.mp.
13. turnover.mp.
14. ou/11-13
15. leadership/
16. management style/ ou hospital management/ ou management/ ou health care personnel management/ ou hospital personnel management/ ou personnel management/ ou health care management/ ou nursing management/
17. leader*.mp
18. administrative personnel/
19. nurse administrator/ ou administrator*.mp.
20. management.mp.
21. ou/15-20
22. et/10,14,21

Bibliothécaire: Laura Banfield
Bibliothèque: Health Sciences Library, McMaster University
Base de données: Embase
Intervalle de données: 1996 au 26 novembre 2021
Résultats: 203

1. emergency nursing/
2. exp nurse/
3. nurs*.mp.
4. ou/2-3
5. emergency ward/
6. ((emergency ou trauma) adj2 (ward* ou department* ou room* ou unit* ou hospital services*)).mp.
7. emergency health service/
8. ou/5-7
9. et/4,8
10. ou/1,9
11. retention.mp.
12. attrition.mp.
13. turnover.mp.
14. ou/11-13
15. leadership/
16. management style/ ou hospital management/ ou management/ ou health care personnel management/ ou hospital personnel management/ ou personnel management/ ou health care management/ ou nursing management/
17. leader*.mp
18. administrative personnel/
19. nurse administrator/ ou administrator*.mp.
20. management.mp.
21. ou/15-20
22. et/10,14,21

Bibliothécaire: Laura Banfield
Bibliothèque: Health Sciences Library, McMaster University
Base de données: CINAHL
Intervalle de données: 1981 to November 26, 2021
Résultats: 168

1. (MH "Emergency Nurse Practitioners") OU (MH "Emergency Nursing")
2. (MH "Nurses+")
3. "nurs*"
4. S2 OU S3
5. (MH "Emergency Service")
6. ((emergency ou trauma) N2 (ward* ou department* ou room* ou unit* ou hospital services*))
7. S5 OU S6
8. S4 ET S7
9. S1 OU S8
10. (MH "Personnel Retention") OU "retention"
11. "attrition"
12. (MH "Personnel Turnover") OU "turnover"
13. S10 OU S11 OU S12
14. (MH "Leadership") OU (MH "Management Styles") OU (MH "Nursing Management") OU (MH "Nurse Managers")
15. Leader or management or administrator*
16. S14 OU S15
17. S9 ET S13 ET S16

Annexe B

Vedettes-matières médicales (MeSH)

Ex: CINAHL
"Emergency Nursing" "Nurses+" "Emergency Service" "Personnel Turnover" ou turnover
"Personnel Retention" ou retention "Leadership" ou management styles ou nursing management ou nurse managers

Annexe C

Liste de vérification PRISMA

Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	attached as abstract
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	4
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	2-5
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	N/A
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	5-6
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	6
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	appendix
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	6,7
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	7
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	6,7
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	7 reported as not assessed
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	7,8

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SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	8
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	8-10
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	N/A
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	10-15
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	15
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	15
Limitations	20	Discuss the limitations of the scoping review process.	16
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	19

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.
* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.
† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).
‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.
§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.

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Identifying and managing latent safety threats through a zone-wide emergency department in-situ multidiscipline simulation program: A quality improvement project

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Abstract

Background: Latent safety threats (LSTs) are system-based issues that threaten patient safety, which can materialize at any time and were previously unrecognized. While LSTs such as system deficiencies, equipment failures, training, or conditions predisposing medical errors are frequently reported in the literature, a paucity was noted in their management and mitigation. The purpose of this quality improvement project was to utilize translational simulations to identify, manage, and mitigate future latent safety threats in our EDs.

Methods: In 2017, 18 in-situ inter-professional simulation sessions were conducted at 11 EDs. Following each session, a survey assessment tool was completed by participants to identify LSTs. Findings were shared with site educators and managers to facilitate institutional follow up. For reporting, LSTs were categorized thematically and coded as either (i) resolved, (ii) ongoing, or (iii) not managed. Site follow-ups were completed at six months, one, and two years following the simulation.

Results: A total *n* = 158 LSTs were identified. The number and percentage by theme were: staff 48 (30.4%), equipment 41 (25.9%), medications 33 (20.9%), resuscitation resources 24 (15.2%), and information technology (IT) issues 12 (7.6%). Twelve-month follow-up identified 149 LSTs resolved and nine required ongoing work to manage. Two-year follow-up identified all but two LSTs resolved. No occurrences of an LST 'not managed' were identified.

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Conclusions: Translation simulation effectively identified LSTs. Through the creation of a structured plan and systematic long-term follow-up, all identified threats were addressed while a limited number required ongoing management.

Keywords: latent safety threat, in-situ simulation, translational simulation, quality improvement, resuscitation

Introduction/Background

Emergency departments (EDs) have a great potential for adverse events. Errors in care result from the increased acuity, complexity, and high-pressure environment. In the United States, yearly, approximately 400,000 hospitalized patients suffer from some form of preventable harm including and around 100,000 patients who die in hospitals and clinics. (Rodziewicz et al., 2021). Many adverse events result from flaws in design, organization, or equipment. These types of preventable errors are referred to as latent safety threats, and may not be apparent to the healthcare team until the adverse event occurs (Patterson et al., 2013). Translational simulation describes healthcare simulation focused directly on improving patient care and healthcare systems, through diagnosing safety and performance issues and delivering simulation-based intervention, irrespective of the location, modality or content (Brazil, 2017). Previous studies conducted in ED and intensive care unit (ICU) settings have demonstrated the effectiveness of translational simulation in proactively identifying latent safety threats thereby creating an opportunity for teams to prevent negative effects before patient care is compromised (Patterson et al., 2013; Petrosoniak et al., 2017; Knight et al., 2018). In addition, a comprehensive process has been proposed to test new departments through simulation (Adler et al., 2018; Barlow et al., 2017). However, despite these efforts highlighting that latent safety threats are common and identifiable through simulation, there is limited evidence on how latent safety threats are effectively managed. The primary objective of this project was to improve quality of care and patient safety by utilizing translational in-situ inter-professional simulation to identify, manage, and mitigate latent safety threats in the ED. Secondary objectives included identification of common latent safety threats between EDs, and determination of standardized quality improvement activities for implementation across the local hospital network.

Methods

Simulation

In 2017, as part of an Edmonton Zone Quality Improvement (QI) Initiative, a translational in-situ multidisciplinary simulation strategy was employed using cross-sectional qualitative QI study methodology. The cumulative patient census of the departments was over 500,000 per year. Prior to commencement of the program, a needs assessment was distributed to participating sites, and data collected aided in content development. A standardized library of simulations was developed and peer reviewed. A total of 18 simulations were completed in 11 EDs. Each simulation consisted of three scenarios and was conducted over four hours, with an adult or pediatric focus.

The simulations were facilitated by a clinical nurse specialist, an adult or pediatric emergency physician, and a simulation consultant. The sessions were open to all site-based ED staff including nurses, physicians, pharmacists, nurse practitioners, and respiratory therapists. Trainees were not included in these simulations. The scenarios were conducted in-situ, similar to previous work (Couto et al., 2018), allowing the inter-professional teams to interact in their own environment, affording the assessment of systemic competence, and detection of latent safety threats.

Prior to engaging in the simulation scenario, participant groups received a pre-brief highlighting the purpose of translational simulation and the intent of identifying latent safety threats in their clinical space. Following each of the three scenarios, facilitators guided a group debrief with particular attention to elicit any latent safety threats. The debriefs were modelled after the PEARLS framework (promoting excellence and reflective learning in simulation) approach, a blended approach that consists of self-assessment, focused discussion, and directed feedback (Eppich & Cheng, 2015). After each simulation, the participants received a QI survey to provide anonymous feedback on the simulations themselves, as well as any system, medical, equipment, or safety threats that they identified. (Appendix A) This survey was created a priori by the research team and based on face validity from expert level consultation with key stakeholders.

Simulation follow-up and latent safety threat mitigation

Within a week of the simulation, the facilitators and the local participating nurse educator completed a separate feedback form (Appendix B) and a copy submitted to the unit manager. This form collated participant, facilitator, and nurse educator perspectives on latent safety threats, identified barriers to change and proposed a plan to improve quality care and mitigate the identified LSTs. The clinical nurse specialist conducted follow-up with the site educator and manager at 6, 12, and 24 months following the simulation. Sites self-reported LSTs mitigation status. The purpose of this follow-up was to determine if a risk reduction strategy was successfully implemented for each identified issue, and if particular latent safety threats had been resolved, required ongoing work to manage, or were not managed. Outcome consensus between the three staff was required.

In addition to the site-specific reduction of latent safety threats, an analysis of all latent safety threats across sites was conducted, identifying a saturation of common themes. Identified themes directly impacting patient safety were brought up at zone quality meetings to assess for common mitigation strategies. Organizational learnings were shared with provincial groups. Following this successful pilot, the initiative has been mandated and supported by local quality leads and directors and has continued as previously described.

Data analysis

Twelve-month site follow up of latent safety threats are reported. Simulation participant survey results were described and categorized thematically. Results were compiled and independently analyzed by two researchers (MC, DOD). Participant comments

regarding specific latent safety threats were independently coded into themes in an emergent fashion by two researchers (MC, DOD). Any disagreements were resolved by a third researcher (WM). Results from the site-specific follow-up surveys were reported as frequency data of whether latent safety threats were managed or not. The examination for common latent safety threats are reported both descriptively and numerically.

Ethics

A Research Ethics Community Consensus Initiative Screening Tool was utilized and determined this work was quality improvement and program evaluation contexts, and was of minimal risk to participants (https://arecci.albertainnovates.ca/). Review by the University of Alberta Ethics Board agreed with this assessment and waived ethics. SQUIRE reporting guidelines (Ogrinc et al. 2015) were followed for manuscript preparation (see Appendix C for reviewer checklist).

Results

A total of 158 latent safety threats were identified using translational in-situ simulations. The number and percentage by theme were: staff 48 (30.4%), equipment 41 (25.9%), medications 33 (20.9%), resuscitation resources 24 (15.2%), and IT issues 12 (7.6%). Six- and twelve-month site follow ups revealed all identified latent safety threats were addressed with 149 latent safety threats resolved (Table 1) and the remaining nine required ongoing efforts to manage after this 12-month review (Table 2). All outcomes were unanimously agreed upon by the site educator, manager, and the clinical nurse specialist. There were no cases of unmanaged latent safety threats. Common threats were identified in multiple EDs that benefited from common quality improvement measures. See Table 3 for description of common specific latent safety threats and the mitigating quality improvement measure that took place at the organizational level.

Table 1

Numbers of Identified Latent Safety Threats and 12-Month Resolution

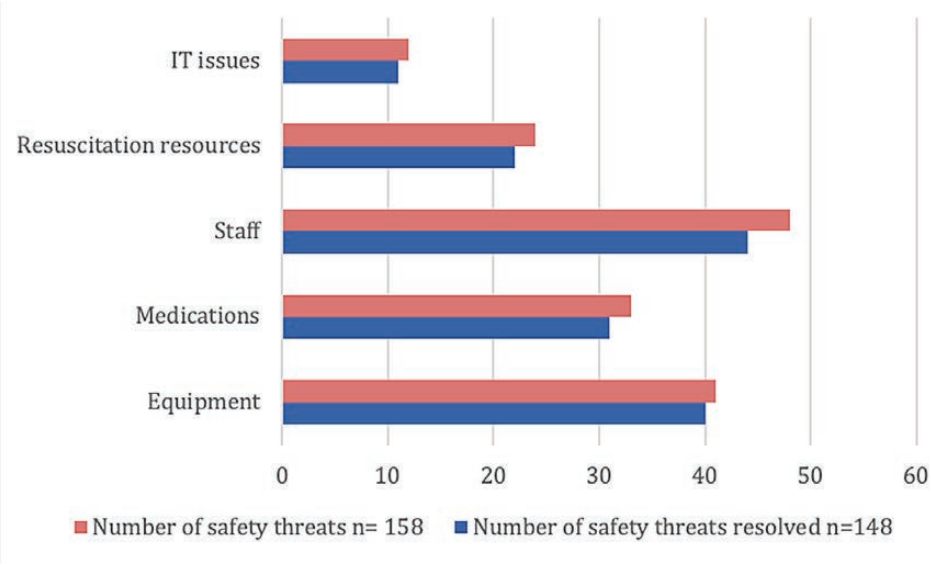

Table 2

Description of Ongoing Threats at 12-Month Follow-Up by Theme

Resuscitation resources	• Code cart only used in one third of the scenarios • Resuscitation room too small
IT issues	• Lack of Website access to resources such as UptoDate
Staff	• Ineffective adenosine administration with stopcock flush • Blood hung by gravity rather than under pressure bag • No fluid warmer used • No respiratory therapist during the night or on shift
Medications	• Missing medications in crash cart to assist with intubation • Parental manual had different administration times between pediatric and adult patients

Table 3

Common Identified Latent Safety Threats in Multiple EDs and Mitigating QI Measures

Latent safety threat theme	Latent safety threat details	Quality improvement measure
Medication	Medication cart far from room and difficulty finding medications and supplies within it	Resuscitation room medication cart created with medications and supplies re-organized
Medication	Particular medications or concentrations missing	Created standardized ED medication list
Medication	Difficulty with pediatric medication calculation during resuscitation	Pediatric calculator uploaded onto resuscitation computers and website
Equipment	Lacking easily accessible procedural equipment like central line & chest tube	Created dedicated procedural kits/boxes
Equipment	Equipment failure including laryngoscopy light not working, overhead infant warmer broken, transvenous pacer balloon failed	Supply carts checked and malfunctioning equipment replaced
Equipment	Unnecessary supplies in room taking up space (e.g., eye cart, suturing cart)	Cleared out resuscitation rooms
Equipment	Non-appropriate equipment identified (e.g., pentastarch IV fluid, trochanter chest tubes, out-of-date Broselow tapes)	Removed and replaced where appropriate
Staff /equipment	No 24/7 respiratory therapist (RT) for BIPAP starts	Ordered Heated Humidified High Flow Nasal Cannula (Airvo) units and trained RNs to utilize to temporize prior to transfer
Staff	Intraosseous placement training lacking	Nursing educational sessions set up for supporting competency and currency
Resuscitation resource	Pediatric cart lacked key supplies, difficult to navigate & find items	Instituted standardized pediatric resuscitation cart and monthly checks
Resuscitation resource	Computer in the room continuously logs out, and the printer doesn't work	Checked all the computers in the room, and fixed printing issue
Resuscitation resource	Delay accessing clinical resources (parental manual, procedural reference, & physician specific resources such as order sets)	Created and maintained a site and zone website as a single point of reference
Resuscitation resource	Delay in mixing infusions (multiple medications and occasions) due in part to not having equipment located together, having to look up mixing and admin instructions	Created a standardized resuscitation focused cart where medications and supplies are grouped together including medication labels with mixing and administration instructions

Following the 12-month follow up and prior to manuscript preparation, a subsequent two-year review was conducted in an identical fashion to the previous reviews to assess the ongoing threats. Eight threats (including one present at multiple sites) from Table 2 were reported to be resolved and two remained due to operational, system, and organizational limitations: building a larger resuscitation room, and increased staffing of a respiratory therapist.

Discussion

The translational simulation quality improvement project successfully identified latent safety threats and supports the recommendation that interdisciplinary simulations should occur across ED teams on a regular basis to support skill retention and improved performance, while promoting high-quality and collaborative care (Heart and Stroke Foundation of Canada, 2020; Kaba et al., 2018). Translational in-situ simulation allows inter-professional teams to identify and mitigate potential errors before reaching patients (Halamek, 2013). When system errors are addressed through a team, the burden on the single provider is lessened and assists in negating individual blame (Van Beuzekom et al., 2010). Exposing and discussing latent risk factors utilizing facilitated debrief following simulated events helps define organizational, management, and environmental factors and facilitates the identification of effective interventions (Van Beuzekom et al., 2010; Zimmerman, 2015).

To ensure lasting change in improving patient safety, our work highlights the importance of continuous follow-up to achieve successful threat mitigation. We noted that on 12-month follow-up, 10 threats remained but required ongoing management to alleviate. Previous work identifies that remaining latent safety threats after this time period are not unexpected (Dadiz, et al. 2020). However, at two-year follow-up, eight of the remaining 10 threats were mitigated. For the two remaining latent safety threats, a) lack of resuscitation space, and b) missing an RRT or key staff, both have been reduced as best as possible given the organizational context and resources. In the case of limited resuscitation space, this has been improved by removing non-resuscitation equipment from the room to maximize the available space. For the decreased number of available RRT, the EDs have provided additional training and support to RN staff.

Our translational simulation quality improvement project integrated a systematic framework. This has been recently well described by Nickson et al. (2021) as an operational approach to implementing translation simulation into practice by exploring environments and targeting interventions focused on clinical performance and quality outcomes. The approach of the systematic framework is based on an input-process-output approach. Our quality improvement project focused significantly on what Nickson et al. (2021) describe as the output stage and our threat mitigation practice practices appeared similar to their described practice of assigning ownership of the identified threats to the operational decision maker/site leadership, and using focused follow up to ensure resolution. This appeared aligned with the emerging literature (Dadiz et al., 2020; Petrosoniak et al., 2019). Without diligent attention to this phase, we do not feel we would have been able to achieve the lasting change in mitigating threats to patient safety.

An unintended consequence of this work was the realization that our findings of common themes are generalizable to the wider province and potentially nationally and internationally. This work was shared provincially to help inform a process improvement plan for all EDs within Alberta. A number of latent safety threats were able to be managed by a broad organizational learning strategy where one threat found in a single ED elucidated change for all the sites. For example, the identification that an inappropriate volume expander (pentastarch) was being stocked in local EDs led to a province-wide process to remove this fluid from all EDs.

Limitations

Our work has limitations, including the nature of our cross-sectional qualitative QI study methodology. We included a convenience sample, which may have resulted in sampling and selection bias of participants.

We did not specifically assess interconnection of threats, though we did find that during the threat mitigation process following the simulation, multiple intervention strategies were often required to address a threat such as equipment layout, process change, and staff training (Dadiz et al., 2020). We feel the interconnectedness of common latent safety threats within the ED is an area of interest for future study.

Conclusions

Translational simulation effectively and consistently identified latent safety threats in all EDs studied with common themes emerging. The systematic creation of a structured plan involving a threat mitigation strategy and follow-up resolved most latent safety threats, with a small number requiring ongoing work to manage. Using translational in-situ inter-professional simulation to identify system issues allows staff to anticipate barriers to care in the actual clinical environment prior to them happening. Once identified, these latent safety threats can be addressed, which directly impacts patient safety.

Takeaways for bedside emergency nurses

- Latent safety threats are common in emergency departments and translational in-situ inter-professional simulation can effectively identify them.
- Using a structured debrief and sustained follow up process resulted in all latent safety threats being identified, mitigated, resolved, or effectively managed.
- Latent safety threat themes were identified and generalizable to the multiple EDs allowing for a collaborative quality improved approach.

Acknowledgments

We acknowledge that we conducted this work on Treaty 6 territory, a traditional meeting grounds, gathering place, and travelling route to the Cree, Saulteaux, Blackfoot, Métis, Dene, and Nakota Sioux. We acknowledge all the many First Nations, Métis, and Inuit whose footsteps have marked these lands for centuries. We would also like to thank all our simulation participants for their feedback and contributions, AHS eSim program for in-kind resources and equipment for conducting the simulations, and our EDs and zone operational leaders in supporting this initiative. The views expressed in this document are solely those of the authors and do not necessarily represent those of their respective employers.

Conflict(s) of interest

We, the authors, declare no conflicts of interest.

CRediT author statement

Domhnall O'Dochartaigh, investigation, data curation, formal analysis, writing-reviewing and editing; Lisa T. L. Ying, writing-reviewing and editing; Kristin Simard, investigation, writing-reviewing and editing; Christina Eichorst, investigation, writing-review and editing; Alyshah Kaba, writing-reviewing and editing, Lorissa Mews, conceptualization, methodology, investigation, writing-review and editing; Melissa Chan, supervision, conceptualization, methodology, investigation, data curation, formal analysis, writing-review and editing; Taryn Brown, conceptualization, investigation, methodology, writing-review and editing; Allison Kirkham, investigation, writing-reviewing and editing; Warren Ma, supervision, investigation, formal analysis, writing-review and editing.

Funding

Simulation sessions and site follow-ups were conducted as part of staff's routine work and supported through staff salaries. We declare no other funding of this project.

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Look for supplemental materials such as author interviews and podcasts at www.CJEN.ca

Appendix A

GENERAL POST-SIMULATION FEEDBACK FORM

Date/ED Site: _____

Please list the simulation topic(s) covered: _____

Please list your role in the simulation (ex MD, nurse, RRT, etc): _____

Please rate your agreement with the following statements:

The simulation achieved the stated learning objectives.

Strongly Disagree Disagree Neutral Agree Strongly Agree

The simulation scenario(s) represented a real-life situation.

Strongly Disagree Disagree Neutral Agree Strongly Agree

I was able to suspend belief during the simulation scenario(s).

Strongly Disagree Disagree Neutral Agree Strongly Agree

I felt that the learning environment was safe

Strongly Disagree Disagree Neutral Agree Strongly Agree

The debriefing session(s) generated useful discussion amongst the group.

Strongly Disagree Disagree Neutral Agree Strongly Agree

The knowledge gained from the scenario(s) will be helpful to me in practice.

Strongly Disagree Disagree Neutral Agree Strongly Agree

The crisis resource management experience gained from the scenario(s) will be helpful in practice.

Strongly Disagree Disagree Neutral Agree Strongly Agree

Please select which CanMeds Roles you feel were covered in the simulation today.

Professional Communicator Collaborator Scholar Health Advocate Leader

Was there any bias you identified today?

Yes No **If you selected "Yes", can you please describe the bias you identified:**

_____

_____

1. ***What did you like most about this session? Any suggestions for improvement?***

_____

_____

2. ***What systems issues were identified during the simulation (e.g., unable to find/don't know how to use equipment, dosing information not available, etc…)?*** **PLEASE BE SPECIFIC**

_____

_____

3. ***Any suggestions on ways to improve system issues?***

_____

_____

Appendix B

GENERAL POST-SIMULATION FEEDBACK FORM – CNEs

Please list the simulation topic(s) covered: _____

Please list your site:

1) What systems issues, or latent safety threats were identified during the simulation (eg. unable to find/unfamiliar with equipment, dosing information not available, etc…)?

_____

_____

2) What suggestions do you have for ways to improve these system issues? (ie. Training, relocating things in the room, obtaining equipment, Access to protocols)

_____

_____

3) What barriers do you predict may make it difficult for your site to improve these system issues?

_____

_____

4) Please list some specific things you could implement within the next 3- 6 months to improve this system issue:

_____

_____

5) What things can the Edmonton Emergency Zone Quality Council do to help you make changes?

_____

_____

Appendix C

Revised Standards for Quality Improvement Reporting Excellence (SQUIRE 2.0) September 15, 2015

Text Section and Item Name	Section or Item Description	
Notes to authors	• The SQUIRE guidelines provide a framework for reporting new knowledge about how to improve healthcare • The SQUIRE guidelines are intended for reports that describe system level work to improve the quality, safety, and value of healthcare, and used methods to establish that observed outcomes were due to the intervention(s). • A range of approaches exists for improving healthcare. SQUIRE may be adapted for reporting any of these. • Authors should consider every SQUIRE item, but it may be inappropriate or unnecessary to include every SQUIRE element in a particular manuscript. • The SQUIRE Glossary contains definitions of many of the key words in SQUIRE. • The Explanation and Elaboration document provides specific examples of well-written SQUIRE items, and an in-depth explanation of each item. • Please cite SQUIRE when it is used to write a manuscript.	**As you review the manuscript, place a checkmark in this column for each SQUIRE item that is appropriately addressed in the manuscript. Remember that not every item is necessary in every manuscript.**
Title and Abstract		
1. Title	Indicate that the manuscript concerns an initiative to improve healthcare (broadly defined to include the quality, safety, effectiveness, patient-centeredness, timeliness, cost, efficiency, and equity of healthcare)	
2. Abstract	a. Provide adequate information to aid in searching and indexing b. Summarize all key information from various sections of the text using the abstract format of the intended publication or a structured summary such as: background, local problem, methods, interventions, results, conclusions	
Introduction	*Why did you start?*	
3. Problem Description	Nature and significance of the local problem	
4. Available knowledge	Summary of what is currently known about the problem, including relevant previous studies	
5. Rationale	Informal or formal frameworks, models, concepts, and/or theories used to explain the problem, any reasons or assumptions that were used to develop the intervention(s), and reasons why the intervention(s) was expected to work	
6. Specific aims	Purpose of the project and of this report	
Methods	*What did you do?*	
7. Context	Contextual elements considered important at the outset of introducing the intervention(s)	
8. Intervention(s)	a. Description of the intervention(s) in sufficient detail that others could reproduce it b. Specifics of the team involved in the work	

9. Study of the Intervention(s)	a. Approach chosen for assessing the impact of the intervention(s) b. Approach used to establish whether the observed outcomes were due to the intervention(s)
10. Measures	**a.** Measures chosen for studying processes and outcomes of the intervention(s), including rationale for choosing them, their operational definitions, and their validity and reliability b. Description of the approach to the ongoing assessment of contextual elements that contributed to the success, failure, efficiency, and cost c. Methods employed for assessing completeness and accuracy of data
11. Analysis	a. Qualitative and quantitative methods used to draw inferences from the data b. Methods for understanding variation within the data, including the effects of time as a variable
12. Ethical Considerations	Ethical aspects of implementing and studying the intervention(s) and how they were addressed, including, but not limited to, formal ethics review and potential conflict(s) of interest
Results	*What did you find?*
13. Results	a. Initial steps of the intervention(s) and their evolution over time (*e.g.*, time-line diagram, flow chart, or table), including modifications made to the intervention during the project b. Details of the process measures and outcome c. Contextual elements that interacted with the intervention(s) d. Observed associations between outcomes, interventions, and relevant contextual elements e. Unintended consequences such as unexpected benefits, problems, failures, or costs associated with the intervention(s). f. Details about missing data
Discussion	*What does it mean?*
14. Summary	a. Key findings, including relevance to the rationale and specific aims b. Particular strengths of the project
15. Interpretation	a. Nature of the association between the intervention(s) and the outcomes b. Comparison of results with findings from other publications c. Impact of the project on people and systems d. Reasons for any differences between observed and anticipated outcomes, including the influence of context e. Costs and strategic trade-offs, including opportunity costs
16. Limitations	a. Limits to the generalizability of the work b. Factors that might have limited internal validity such as confounding, bias, or imprecision in the design, methods, measurement, or analysis c. Efforts made to minimize and adjust for limitations
17. Conclusions	a. Usefulness of the work b. Sustainability c. Potential for spread to other contexts d. Implications for practice and for further study in the field e. Suggested next steps
Other information	
18. Funding	Sources of funding that supported this work. Role, if any, of the funding organization in the design, implementation, interpretation, and reporting

CANADIAN JOURNAL of EMERGENCY NURSING
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Identification et gestion des risques latents en matière de sécurité par le biais d'un programme de simulation multidisciplinaire in situ des services d'urgence à l'échelle régionale : un projet d'amélioration de la qualité

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Résumé

Contexte : On définit les menaces latentes de sécurité (MLS) comme des problèmes systémiques qui menacent la sécurité des patients, qui peuvent se matérialiser à tout moment et qui étaient précédemment non reconnus. Alors que les MLS sont fréquemment signalés dans la documentation, comme les lacunes du système, les défaillances de l'équipement, la formation ou les conditions qui prédisposent aux erreurs médicales, on a constaté que leur gestion et leur atténuation étaient rares. Ce projet d'amélioration de la qualité avait pour but de mettre en œuvre des simulations translationnelles afin d'identifier, de gérer et d'atténuer les futures menaces latentes pour la sécurité dans nos services d'urgence.

Méthodes : En 2017, 18 sessions de simulation interprofessionnelle sur place ont été menées dans 11 services d'urgence. À la fin de chaque session, les participants ont complété un outil d'évaluation afin d'identifier les MLS. Les résultats ont été partagés avec les éducateurs et les gestionnaires du site afin de faciliter le suivi institutionnel. Aux fins des rapports, les MLS ont été catégorisées par thème et codés comme (i) résolus (ii) en cours, ou (iii)

non gérés. Le suivi a été effectué à un intervalle de six mois, d'un an et de deux ans après la simulation.

Résultats : Un total de *n* = 158 MLS ont été identifiés. La répartition par thème est la suivante : personnel 48 (30,4 %), équipement 41 (25,9 %), médicaments 33 (20,9 %), ressources de réanimation 24 (15,2 %) et problèmes de technologie de l'information (TI) 12 (7,6 %). Le suivi à douze mois a révélé que 149 MLS avaient été résolus et que neuf exigeaient une gestion continue. Le suivi à deux ans a indiqué que tous les cas de MLS sauf deux ont été résolus. Aucun cas de MLS « non géré » n'a été identifié.

Conclusions : La simulation translationnelle a permis de bien identifier les MLS. En élaborant un plan structuré et en assurant un suivi systématique à long terme, toutes les menaces identifiées ont été réglées, même si quelques-unes ont nécessité une gestion continue.

Mots clés: Menace latente pour la sécurité, simulation in situ, simulation translationnelle, amélioration de la qualité, réanimation

Introduction et Contexte

Les services d'urgence (SU) présentent un grand risque d'événements indésirables. Les erreurs médicales découlent de l'acuité et de la complexité accrues des soins, ainsi que de l'environnement exigeant et stressant. Chaque année, aux États-Unis, environ 400 000 patients hospitalisés souffrent d'une forme quelconque de préjudice évitable et environ 100 000 patients meurent dans les hôpitaux et les cliniques (Rodziewicz T, Houseman B, et Hipskind J (2021). La plupart des événements indésirables sont la conséquence de défauts de conception, d'organisation ou d'équipement. Ce genre d'erreurs évitables, appelé menaces latentes pour la sécurité, peut échapper à l'équipe soignante jusqu'à ce que l'événement indésirable se produise (Patterson, Geis, Falcone, LeMaster, Wears, 2013). La simulation translationnelle fait référence à la simulation des soins de santé directement axée sur l'amélioration des soins aux patients et des systèmes de soins de santé, en identifiant les problèmes de sécurité et de performance et en fournissant une intervention fondée sur la simulation, indépendamment du lieu, de la modalité ou du contenu (Brazil, 2017). Selon des études antérieures menées dans des services d'urgence et des unités de soins intensifs, la simulation translationnelle offre l'avantage d'une identification proactive des menaces latentes pour la sécurité, ce qui permet aux équipes de prévenir les effets négatifs avant que les soins aux patients ne soient compromis (Patterson, et coll., 2013 ; Petronsoniak, et coll., 2013 ; Knight, et coll. 2018 ; Lang, et coll. 2013). Par ailleurs, une démarche approfondie pour tester les nouveaux départements par la simulation a été proposée (Alder et coll., 2018 ; Barlow, et coll., 2017). Cependant, malgré ces efforts soulignant que les menaces latentes pour la sécurité sont courantes et détectables par la simulation, on dispose de peu de données sur la manière dont elles sont gérées efficacement. Le premier objectif de ce projet était d'améliorer la qualité des soins et la sécurité des patients en utilisant la simulation translationnelle interprofessionnelle en milieu de travail pour identifier, gérer et atténuer les menaces latentes pour la sécurité aux urgences. En second lieu, les objectifs comprenaient l'identification des menaces latentes communes en matière de sécurité entre les différents services d'urgence, et la fixation de mesures d'amélioration de la qualité normalisées à mettre en œuvre dans le réseau hospitalier local.

Méthodes

Simulation

Dans le cadre d'une initiative d'étude qualitative transversale (AQ) de la zone d'Edmonton, en 2017, une stratégie de simulation multidisciplinaire translationnelle in situ a été employée selon une méthodologie d'AQ. Le recensement cumulé des patients dans les départements était supérieur à 500 000 par an. Une évaluation des besoins a été distribuée aux sites participants avant le début du programme, et les données recueillies ont servi à l'élaboration du contenu. Une bibliothèque de simulations normalisées a été élaborée et examinée par des pairs. Au total, 18 simulations ont été réalisées dans 11 services d'urgence. Chaque simulation comportait trois scénarios et se déroulait sur une période de quatre heures, avec une orientation adulte ou pédiatrique.

Les simulations étaient dirigées par une infirmière clinicienne spécialisée, un médecin urgentiste adulte ou pédiatrique et un consultant en simulation. Les sessions de simulation étaient destinées à l'ensemble du personnel des services d'urgence du site, y compris les infirmières, les médecins, les pharmaciens, les infirmières praticiennes et les inhalothérapeutes, mais n'étaient pas ouvertes aux stagiaires. Les scénarios ont été réalisés sur place, à l'instar de travaux antérieurs (Couto, Barreto, Marcon, Mafra, et Accorsi, 2018) permettant aux équipes interprofessionnelles d'interagir dans leur propre environnement, favorisant l'évaluation de la compétence systémique et la détection de menaces latentes pour la sécurité.

Les groupes de participants ont été informés, avant de participer au scénario de simulation, de l'objectif de la simulation translationnelle et de l'intention d'identifier les menaces latentes pour la sécurité dans leur espace clinique. À la suite de chacun des trois scénarios, les animateurs ont mené un compte rendu de groupe en veillant particulièrement à faire ressortir toute menace latente pour la sécurité. Les comptes rendus ont été conçus à partir de l'approche du cadre PEARLS (promotion de l'excellence et de l'apprentissage réfléchi dans la simulation), une approche mixte qui consiste en une auto-évaluation, une discussion ciblée et une rétroaction dirigée (Eppich et Cheng, 2015). Les participants ont reçu un sondage sur l'AQ après chaque simulation afin de fournir un retour d'information anonyme sur celles-ci ainsi que sur toute menace identifiée concernant le système, la médecine, l'équipement ou la sécurité. **(Annexe A)** Cette enquête a été rédigée préalablement par l'équipe de recherche et fondée sur la validité apparente de la consultation d'experts avec les principales parties prenantes.

Suivi des simulations et atténuation des menaces latentes pour la sécurité

La semaine après la simulation, les animateurs et l'infirmier(ère) enseignant(e) participant(e) local(e) ont rempli un formulaire de rétroaction à part (annexe B) et en ont remis une copie au gestionnaire de l'unité. Ce formulaire a permis de rassembler les opinions des participants, des animateurs et des infirmières enseignantes sur les menaces latentes pour la sécurité, d'identifier les obstacles au changement et de proposer un plan pour améliorer la qualité des soins et atténuer les MLS identifiées. L'infirmière clinicienne spécialisée a effectué un suivi avec l'éducateur et le responsable du site à 6, 12 et 24 mois après la simulation. Les sites ont eux-mêmes déclaré l'état d'atténuation des MLS. Ce suivi visait à déterminer si une stratégie de réduction des risques avait été appliquée efficacement pour chaque problème identifié, et si des menaces latentes particulières pour la sécurité avaient été résolues, nécessitait un travail continu pour être géré, ou n'était pas géré. Il fallait un consensus sur les résultats entre les trois membres du personnel.

En plus de la réduction des MLS propre à chaque site, une analyse de toutes les menaces latentes pour la sécurité sur l'ensemble des sites a été réalisée, mettant en lumière une saturation de thèmes communs. Lors des réunions sur la qualité dans les zones, les thèmes ayant un impact direct sur la sécurité des patients ont été abordés afin d'évaluer les stratégies d'atténuation communes. Les découvertes organisationnelles ont été partagées avec les groupes provinciaux. À la suite de ce projet pilote réussi, l'initiative a été autorisée et soutenue par les responsables et directeurs locaux de la qualité et s'est poursuivie telle que décrite précédemment.

Analyse des données

On rapporte le suivi des menaces de sécurité latentes sur le site à douze mois. Les résultats de l'enquête auprès des participants à la simulation ont été décrits et classés par thème. Les résultats ont été colligés et analysés indépendamment par deux chercheurs (MC, DOD). Les commentaires des participants concernant les menaces latentes en matière de sécurité ont été codés indépendamment en thèmes de manière émergente par deux chercheurs (MC, DOD). Les désaccords ont été résolus par un troisième chercheur (WM). Les résultats des enquêtes de suivi spécifiques aux sites ont été rapportés sous forme de données de fréquence indiquant si les menaces latentes pour la sécurité ont été gérées ou non. L'examen des MLS courantes est rapporté sous forme descriptive et numérique.

Éthique

On a utilisé un outil de vérification de l'initiative de consensus communautaire sur l'éthique de la recherche. On a déterminé que ce travail s'inscrivait dans un contexte d'amélioration de la qualité et d'évaluation de programmes, et qu'il présentait un risque minimal pour les participants. (https://arecci.albertainnovates.ca/) Le comité d'éthique de la University of Alberta était d'accord avec cette évaluation et a renoncé à l'éthique. Les manuscrits ont été préparés conformément aux lignes directrices de SQUIRE (Ogrinc et coll., 2015). (Annexe C pour la liste de contrôle des examinateurs).

Résultats

En tout, 158 menaces latentes pour la sécurité ont été identifiées à l'aide de simulations translationnelles in situ. Le nombre et le pourcentage par thème étaient les suivants : personnel 48 (30,4 %), équipement 41 (25,9 %), médicaments 33 (20,9 %), ressources de réanimation 24 (15,2 %) et problèmes informatiques 12 (7,6 %). Le suivi du site au bout de six et douze mois a révélé que toutes les menaces latentes pour la sécurité ont été réglées : 149 menaces latentes pour la sécurité ont été résolues (tableau 1) et les neuf autres ont exigé des efforts pour leur gestion après cet examen de 12 mois (tableau 2). Tous les résultats ont été approuvés à l'unanimité par l'éducateur du site, le gestionnaire et l'infirmière clinicienne spécialisée. On n'a relevé aucun cas de menaces latentes non gérées pour la sécurité. On a relevé des menaces communes

Tableau 1

Nombre de menaces de sécurité latentes identifiées et résolution à 12 mois

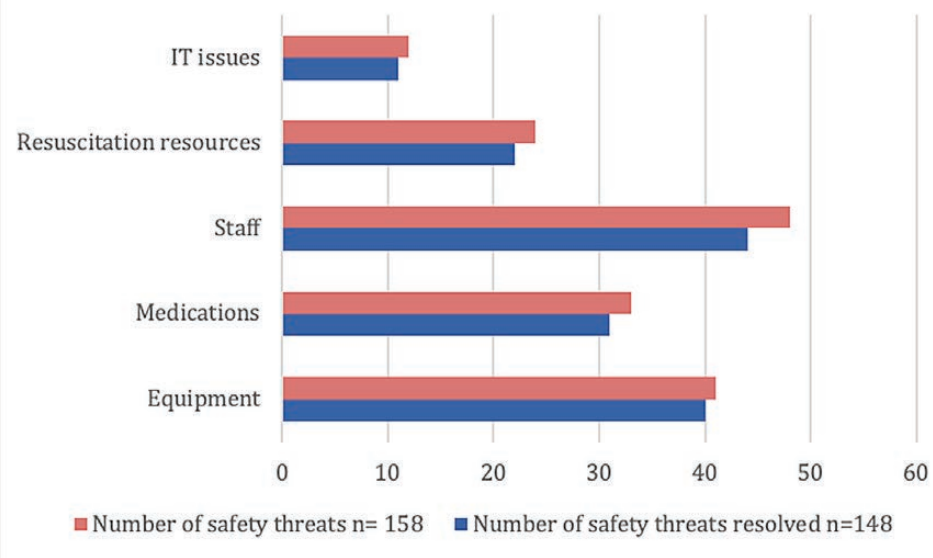

Tableau 2

Description par thème des menaces permanentes lors du suivi à 12 mois

Ressources en réanimation	• Le chariot d'urgence n'est utilisé que dans un tiers des scénarios • Salle de réanimation trop petite
Problèmes techniques	• Accès insuffisant du site Web à des ressources telles qu'UptoDate
Personnel	• Administration inefficace d'adénosine avec rinçage du robinet d'arrêt. • Sang suspendu par gravité plutôt que sous sac à pression. • Aucun réchauffeur de fluide n'a été utilisé. • Pas d'inhalothérapeute pendant la nuit ou le quart de travail
Médicaments	• Absence de médicaments dans le chariot d'urgence pour aider à l'intubation. • Le manuel parental prévoyait des délais d'administration différents entre les patients pédiatriques et adultes

dans plusieurs services d'urgence qui ont bénéficié de mesures communes d'amélioration de la qualité. Le tableau 3 présente une description des menaces latentes communes et précises pour la sécurité ainsi que les mesures d'amélioration de la qualité qui ont été prises sur le plan organisationnel.

Au terme du suivi de 12 mois et avant la préparation du manuscrit, un autre examen de deux ans a été réalisé de manière identique aux examens précédents afin d'évaluer les menaces continues. Huit menaces du tableau 2 (dont une présente sur plusieurs sites) ont été résolues et deux subsistent en raison de limitations opérationnelles, systémiques et organisationnelles : construction d'une salle de réanimation plus grande et augmentation du nombre d'inhalothérapeutes.

Discussion

Le projet de simulation translationnelle d'amélioration de la qualité a permis d'identifier des menaces latentes pour la sécurité. Il confirme la recommandation selon laquelle des simulations interdisciplinaires devraient être organisées régulièrement au sein des équipes des services d'urgence afin de favoriser le maintien des compétences et l'amélioration du rendement, tout en préconisant des soins de qualité axés sur la collaboration (Heart and Stroke, 2020; Kaba, Due, Charania et Donahue, 2018). Les simulations translationnelles in situ permettent aux équipes interprofessionnelles d'identifier et d'atténuer les erreurs potentielles avant qu'elles n'atteignent les patients (Halamek, 2013). Le fait de traiter les erreurs de système en équipe allège le fardeau du fournisseur particulier et permet d'éviter le blâme individuel (Van Beuzekom, Boer, Akerboom, et Hudson, 2010. En exposant et en discutant les facteurs de risque latents à l'aide d'un compte rendu animé après des exercices de simulation, on peut définir les facteurs organisationnels, de gestion et environnementaux et faciliter l'identification d'interventions efficaces [Van Beuzekom, Boer, Akerboom et Hudson, 2010 ; Zimmerman, K. 2015].

Afin de s'assurer d'un changement durable dans l'amélioration de la sécurité des patients, notre travail souligne le caractère essentiel d'un suivi continu pour réussir à atténuer les menaces. Nous avons constaté qu'au bout de 12 mois, dix menaces subsistaient, mais nécessitaient une gestion continue pour les atténuer. Selon des travaux précédents, la persistance de menaces latentes pour la sécurité après cette période n'est pas inattendue [Dadiz et coll., 2020]. Toutefois, à l'issue d'un suivi de deux ans, huit des dix menaces restantes avaient été atténuées. En ce qui concerne les deux menaces latentes restantes, a) le manque d'espace de réanimation et b) l'absence d'inhalothérapeutes ou de personnel clé, elles ont été réduites du mieux possible compte tenu du contexte et des ressources de l'organisation. En ce qui concerne l'espace limité pour la réanimation, la situation a été améliorée en retirant de la pièce le matériel ne servant pas à la réanimation afin de maximiser l'espace existant. En raison de la diminution du nombre d'inhalothérapeutes en poste, les services d'urgence ont offert une formation et un soutien supplémentaires au personnel infirmier.

Un cadre systématique a été intégré à notre projet d'amélioration de la qualité de la simulation translationnelle. Nickson, Petrosoniak, Barwick et Brazil (2021) l'ont récemment bien décrit comme étant une approche opérationnelle pour faire appliquer la simulation translationnelle dans la pratique, tout en explorant les environnements et en ciblant les interventions axées sur la performance clinique et des résultats de qualité. L'approche du cadre systématique est basée sur une approche de type intrantsprocessus-extrants. Notre projet d'amélioration de la qualité était largement axé sur ce que Nickson et al (2021) décrivent comme l'étape de sortie. Nos pratiques d'atténuation des menaces semblaient similaires à celles qu'ils décrivent, soit attribuer la responsabilité du problème identifié au décideur opérationnel ou à la direction du site, puis assurer un suivi ciblé pour garantir la résolution du problème. Cette démarche semble conforme à la littérature émergente (Dadiz, et coll., 2020 ;

Tableau 3

Menaces latentes communes en matière de sécurité dans plusieurs services d'urgence et mesures d'atténuation de l'AQ

Thème de la menace latente pour la sécurité	Détails des menaces latentes pour la sécurité	Mesures d'amélioration de la qualité
Médicament	Le chariot de médicaments est éloigné de la pièce. Difficulté à trouver les médicaments et les fournitures qu'il contient.	Installation d'un chariot de médicaments dans la salle de réanimation et réorganisation des médicaments et des fournitures
Médicament	Absence de certains médicaments ou de certaines concentrations	Élaboration d'une liste normalisée de médicaments pour les urgences
Médicament	Difficulté à calculer les médicaments pédiatriques pendant la réanimation	Calculateur pédiatrique téléchargé sur les ordinateurs et le site Web de la réanimation
Équipement	Manque de matériel de procédure facilement accessible, comme un cathéter central ou un drain thoracique	Création de trousses et de boîtes de procédures adaptées
Équipement	Défaillance de l'équipement, y compris une lampe de laryngoscopie défectueuse, un chauffe-bébé suspendu brisé, un ballonnet de stimulateur transveineux défaillant	Vérification des chariots de fournitures et remplacement des équipements défectueux
Équipement	Fournitures inutiles occupant de l'espace dans la salle (par exemple, chariot pour les yeux, chariot pour les sutures)	Les salles de réanimation ont été libérées
Équipement	Matériel non approprié trouvé (par exemple, liquide IV pentastarch, sondes thoraciques trochanter, bandes de Broselow périmées)	Retiré et remplacé, le cas échéant
Personnel/ équipement	Pas d'inhalothérapeute disponible 24/7 pour le démarrage de la BIPAP	Commande d'unités de canules nasales chauffées, humidifiées et à haut débit (Airvo) et formation des IA pour qu'elles puissent temporiser avant le transfert
Personnel	Manque de formation sur l'accès intraosseux	Mise en place de sessions de formation en soins infirmiers pour soutenir la compétence à jour
Ressources en réanimation	Manque de fournitures essentielles dans le chariot pédiatrique. Navigation et recherche d'articles difficiles	Mise en place d'un chariot de réanimation pédiatrique normalisé et vérifications mensuelles
Ressources en réanimation	L'ordinateur dans la salle se déconnecte continuellement et l'imprimante ne fonctionne pas	Vérification de tous les ordinateurs de la salle. Problèmes d'impression résolus
Ressources en réanimation	Retard dans l'accès aux ressources cliniques (manuel parentéral, référence procédurale et ressources propres au médecin, par exemple les ensembles d'ordonnances)	Conception et administration d'un site Web et d'un site de zone comme point de repère unique
Ressources en réanimation	Retard dans le mélange des perfusions (plusieurs médicaments et occasions) attribuable en partie au fait que les équipements ne sont pas tous situés au même endroit et qu'il faut chercher les instructions de mélange et d'administration	Création d'un chariot normalisé axé sur la réanimation où les médicaments et les fournitures sont réunis, y compris les étiquettes des médicaments avec les instructions de mélange et d'administration

Petrosoniak, Almeida, Pozzobon LD, Hicks C, Fan M, et coll., 2019). Sans la diligence dont nous avons fait preuve au cours de cette phase, nous estimons que nous n'aurions pas été en mesure d'obtenir un changement durable dans l'atténuation des menaces pour la sécurité des patients.

Une conséquence inattendue a été la constatation que nos conclusions sur les thèmes communs peuvent être généralisées à l'ensemble de la province et possiblement à l'échelle nationale et internationale. Cette étude a été partagée avec la province afin de contribuer à l'élaboration d'un plan d'amélioration des processus pour tous les services d'urgence de l'Alberta. Un certain nombre de menaces latentes pour la sécurité ont pu être gérées par une stratégie organisationnelle de formation, où une menace découverte dans un seul service d'urgence a permis d'apporter des améliorations dans tous les sites. Par exemple, la découverte qu'un expanseur de volume inapproprié (pentastarch) était entreposé dans les urgences locales a suscité une opération provinciale visant à retirer ce fluide de toutes les urgences.

Limitations

Notre étude a des limitations, notamment la nature de notre méthodologie d'étude qualitative transversale d'AQ. Nous avons inclus un échantillon de commodité, ce qui peut avoir entraîné un biais d'échantillonnage et de sélection des participants. Nous n'avons pas expressément étudié l'interconnexion des menaces, mais nous avons constaté qu'au cours du processus d'atténuation des menaces après la simulation, de multiples stratégies d'intervention étaient souvent nécessaires pour contrer une menace, comme l'aménagement de l'équipement, la modification du processus et la formation du personnel (Dadiz et coll., 2020). Nous estimons que l'interconnexion des menaces latentes communes à la sécurité dans les services d'urgence est un domaine d'intérêt pour des études ultérieures.

Conclusions

La simulation translationnelle a permis de cerner efficacement et systématiquement les menaces latentes pour la sécurité dans toutes les urgences étudiées, et a fait émerger des thèmes communs. L'élaboration systématique d'un plan structuré impliquant une stratégie d'atténuation des menaces et un suivi a permis de résoudre la plupart des menaces latentes pour la sécurité, quelques-unes exigeant un travail continu de gestion. L'application de la simulation interprofessionnelle translationnelle sur place destinée à identifier les problèmes du système permet au personnel d'anticiper les obstacles aux soins dans le véritable environnement clinique avant qu'ils ne se produisent. Une fois identifiées, ces menaces latentes pour la sécurité peuvent être réglées, ce qui a un impact direct sur la sécurité des patients.

Les répercussions sur la pratique clinique des urgences

- Les menaces latentes pour la sécurité sont communes dans les services d'urgence et la simulation translationnelle interprofessionnelle in situ peut les identifier efficacement
- Le fait de recourir à un compte rendu structuré et à un processus de suivi à long terme a permis d'identifier, d'atténuer, de résoudre ou de gérer efficacement toutes les menaces latentes pour la sécurité
- Des thèmes latents de menace pour la sécurité ont été identifiés et peuvent être généralisés à plusieurs services d'urgence permettant une approche collaborative d'amélioration de la qualité.

Remerciements

Nous reconnaissons que nous avons effectué ce travail sur le territoire du Traité no. 6, un lieu de rencontre traditionnel, un lieu de rassemblement et une route de voyage pour les Cris, les Saulteux, les Pieds-Noirs, les Métis, les Dénés et les Sioux Nakota. Nous reconnaissons les nombreuses Premières Nations, les Métis et les Inuits dont les traces ont marqué ces terres depuis des siècles. Nous tenons également à remercier tous les participants aux exercices de simulation pour leurs commentaires et leurs contributions, le programme eSim de l'AHS pour les ressources en nature et l'équipement nécessaires à la réalisation des simulations, ainsi que les dirigeants opérationnels des services d'urgence et des zones qui ont soutenu cette initiative. Les points de vue exprimés dans ce document sont uniquement ceux des auteurs et ne représentent pas nécessairement ceux de leurs employeurs respectifs.

Conflits d'intérêts

Les auteurs déclarent ne pas avoir de conflits d'intérêts.

Déclaration de l'auteur (CRediT)

Domhnall O'Dochartaigh, Enquête, collecte de données, analyse formelle, rédaction, révision et correction ; Lisa TL Ying rédaction — révision et correction

Kristin Simard, Enquête, rédaction - révision et correction

Christina Eichorst, Enquête, rédaction - révision et correction

Alyshah Kaba rédaction — révision et correction

Lorissa Mews conceptualisation, méthodologie, enquête, rédaction - révision et correction

Melissa Chan supervision, conceptualisation, méthodologie, enquête, collecte de données, analyse formelle, rédaction — révision et correction

Taryn Brown conceptualisation, enquête, méthodologie, rédaction — révision et correction

Allison Kirkham Enquête, rédaction - révision et correction

Warren Ma supervision, enquête, analyse formelle, rédaction — révision et correction

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Look for supplemental materials such as author interviews and podcasts at www.CJEN.ca

Annexe A

FICHE GÉNÉRALE DE RÉTROACTION POST-SIMULATION

Date/emplacement du DE : _____

Veuillez énumérer le(s) sujet(s) de simulation abordé(s) : _____

Veuillez indiquer votre rôle dans la simulation (ex. médecin, infirmière, inhalothérapeute, etc.) : _____

Veuillez indiquer votre accord avec les déclarations suivantes :

La simulation a atteint les objectifs d'apprentissage fixés

Pas du tout d'accord Pas d'accord Neutre D'accord Fortement d'accord

Le(s) scénario(s) de simulation représentaient une situation de vie réelle

Pas du tout d'accord Pas d'accord Neutre D'accord Fortement d'accord

J'ai été capable de mettre de côté mes croyances pendant le(s) scénario(s) de simulation)

Pas du tout d'accord Pas d'accord Neutre D'accord Fortement d'accord

J'ai eu l'impression que l'environnement d'apprentissage était sécuritaire

Pas du tout d'accord Pas d'accord Neutre D'accord Fortement d'accord

La (les) session(s) de compte rendu a (ont) généré une discussion utile au sein du groupe

Pas du tout d'accord Pas d'accord Neutre D'accord Fortement d'accord

Les connaissances acquises lors du ou des scénarios me seront utiles dans la pratique

Pas du tout d'accord Pas d'accord Neutre D'accord Fortement d'accord

The crisis resource management experience gained from the scenario(s) will be helpful in practice.

Pas du tout d'accord Pas d'accord Neutre D'accord Fortement d'accord

Veuillez sélectionner les rôles CanMeds qui, selon vous, ont été abordés dans la simulation aujourd'hui

Professionnel Communicateur Collaborateur Érudit Porte-parole en matière de santé Leader

Avez-vous relevé un élément de partialité aujourd'hui ?

Oui Non **Si vous avez répondu « Oui », pouvez-vous décrire le biais que vous avez identifié :**

_____

_____

1. ***Qu'avez-vous apprécié le plus dans cette session ? Avez-vous des suggestions d'amélioration ?***

_____

_____

2. ***Quels problèmes liés aux systèmes ont été signalés au cours de la simulation (par exemple, incapacité à trouver ou ne pas savoir comment utiliser l'équipement, informations sur le dosage non disponibles, etc.) ? VEUILLEZ ÊTRE PRÉCIS***

_____

_____

3. ***Des suggestions sur les moyens d'améliorer les problèmes du système ?***

_____

_____

Annexe B

FICHE GÉNÉRALE DE RÉTROACTION POST-SIMULATION — infirmier(ère) enseignant(e) certifié(e)

Veuillez énumérer le(s) sujet(s) de simulation abordé(s) : _____

Veuillez indiquer votre emplacement :

1) Quels problèmes de systèmes ou menaces latentes pour la sécurité ont été décelés pendant la simulation (par exemple, impossibilité de trouver les équipements ou méconnaissance de ceux-ci, informations sur le dosage non disponibles, etc.) ?

_____

_____

2) Quelles sont vos suggestions pour améliorer ces problèmes systémiques ? (p. ex. formation, déménagement des objets dans la salle, obtention d'équipement, accès aux protocoles, etc.)

_____

_____

3) Selon vous, quels obstacles pourraient empêcher votre site d'améliorer ces problèmes de fonctionnement ?

_____

_____

4) Veuillez préciser les mesures concrètes que vous pourriez mettre en pratique dans les 3 à 6 prochains mois pour améliorer ce problème systémique :

_____

_____

5) Comment le conseil Edmonton Emergency Zone Quality peut-il vous aider à apporter des changements ?

_____

_____

Annexe C

Normes révisées pour l'excellence des rapports sur l'amélioration de la qualité (SQUIRE 2.0) Le 15 septembre 2015

Rubrique et élément de texte	Description de la rubrique ou de l'élément	
Notes aux auteurs	• Les directives SQUIRE constituent un cadre pour la communication de nouvelles connaissances sur la manière d'améliorer les soins de santé • Les directives SQUIRE sont conçues pour les rapports qui décrivent le travail au niveau du système pour améliorer la qualité, la sécurité et la valeur des soins de santé, et qui ont employé des méthodes pour établir que les résultats observés étaient attribuables aux interventions) • Il existe toute une gamme d'approches pour améliorer les soins de santé. SQUIRE peut être adapté pour rendre compte de chacune d'entre elles • Les auteurs sont priés de prendre en compte chaque élément SQUIRE, tout en sachant qu'il peut être inapproprié ou inutile d'inclure chaque élément SQUIRE dans un manuscrit particulier • Le glossaire de SQUIRE contient les définitions de nombreux mots clés de l'ouvrage • Le document d'explication et d'élaboration fournit des exemples précis d'items SQUIRE bien rédigés, ainsi qu'une explication approfondie de chaque item • Veuillez citer SQUIRE lorsqu'il est employé pour rédiger un manuscrit	**Pendant l'examen du manuscrit, cochez dans cette colonne chaque élément du SQUIRE qui est correctement traité dans le manuscrit.** **Sachez que tous les éléments ne sont pas nécessaires dans tous les manuscrits.**
Titre et résumé		
1. Titre	Indiquez que le manuscrit porte sur une initiative visant à améliorer les soins de santé (en général, la qualité, la sécurité, l'efficacité, l'attention portée au patient, la rapidité, le coût, et l'équité des soins de santé)	
2. Résumé	a. Fournir suffisamment d'informations pour faciliter la recherche et l'indexation b. Synthétisez toutes les informations clés des différentes sections du texte en utilisant le format du résumé de la publication prévue ou un résumé structuré, par exemple : contexte, problème local, méthodes, interventions, résultats, conclusions	
Introduction	*Pourquoi avez-vous entamé ce projet ?*	
3. Description du problème	Nature et importance du problème local	
4. Connaissances disponibles	Aperçu des connaissances actuelles sur le problème, y compris les études antérieures pertinentes	
5. Justification	Cadres, modèles, concepts et/ou théories informels ou formels utilisés pour expliquer le problème, toutes les raisons ou hypothèses qui ont été utilisées pour développer les interventions, et les raisons pour lesquelles on s'attendait à ce que les interventions réussissent	
6. Buts particuliers	Objectif du projet et du présent rapport	
Méthodes	*Qu'avez-vous fait ?*	
7. Contexte	Éléments contextuels jugés importants à l'origine de l'introduction de l'intervention	
8. Intervention(s)	a. Description suffisamment détaillée de l'intervention ou des interventions pour que d'autres puissent la reproduire. b. Détails concernant l'équipe impliquée dans le travail	
9. Étude de l'intervention ou des interventions)	a. Approche retenue pour évaluer l'impact de la ou des interventions b. Approche adoptée pour établir si les résultats observés sont dus à l'intervention ou aux interventions	

10. Mesures	a. Les mesures adoptées pour étudier les processus et les résultats de l'intervention ou des interventions, y compris les raisons de leur choix, leurs définitions opérationnelles, leur validité et leur fiabilité b. Description de l'approche de l'évaluation continue des éléments contextuels qui ont contribué au succès, à l'échec, à l'efficacité et au coût de l'intervention c. Méthodes employées pour évaluer l'exhaustivité et l'exactitude des données
11. Analyse	a. Les méthodes qualitatives et quantitatives utilisées pour tirer des conclusions à partir des données b. Méthodes permettant de comprendre les variations au sein des données, y compris les effets du temps en tant que variable
12. Considérations d'ordre éthique	Les dimensions éthiques de la réalisation et de l'étude de l'intervention ou des interventions et la manière dont elles ont été abordées, y compris, sans s'y limiter, l'examen éthique formel et les conflits d'intérêts potentiels
Résultats	*Qu'avez-vous trouvé ?*
13. Résultats	a. Les premières étapes de l'intervention ou des interventions et leur évolution dans le temps (par exemple, diagramme chronologique, organigramme ou tableau), y compris les modifications apportées à l'intervention au cours du projet b. Détails relatifs aux mesures du processus et aux résultats c. Les éléments contextuels qui ont interagi avec l'intervention ou les interventions d. Associations observées entre les résultats, les interventions et les éléments contextuels pertinents e. Les conséquences inattendues telles que les avantages, les problèmes, les échecs ou les coûts inattendus associés à l'intervention ou aux interventions f. Détails sur les données manquantes
Discussion	*Qu'est-ce que cela signifie ?*
14. Récapitulatif	a. Principales constatations, y compris la pertinence par rapport à la justification et aux objectifs précis b. Points forts particuliers du projet
15. Interprétation	a. Nature de la relation entre l'intervention ou les interventions et les résultats b. Comparaison des résultats avec ceux d'autres publications c. Impact du projet sur les gens et les systèmes d. Raisons de tout écart entre les résultats observés et les résultats prévus, y compris l'influence du contexte e. Coûts et compromis stratégiques, y compris les coûts d'opportunité
16. Limitations	a. Les limites de la généralisation des travaux b. Facteurs qui ont pu limiter la validité interne, tels que la confusion, le biais ou l'imprécision de la conception, les méthodes, la mesure ou l'analyse. c. Les efforts déployés pour minimiser et corriger les limites
17. Conclusions	a. Utilité du projet b. Durabilité c. Potentiel de transfert à d'autres contextes d. Implications pour la pratique et pour la poursuite des études dans ce domaine e. Prochaines étapes suggérées
Autres renseignements	
18. Financement	Sources de financement qui ont contribué à ce projet. Le cas échéant, rôle de l'organisme de financement dans la conception, la mise en œuvre, l'interprétation et le rapport

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Comparison Of Non-Clinical Tourniquet Research for Appliance Superiority & Tolerance (CONTRAST): A systematic review and meta-analysis of commercial and improvised tourniquet devices for arterial occlusion, application speed, and tolerance

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All authors meet the ICMJE and CRediT authorship criteria.

Abstract

Background: Tourniquets are effective tools to manage life-threatening extremity hemorrhage. Commercial devices are recommended over improvised techniques; however, mass casualty incidents and austere environments may prevent access to commercial devices. The aim of this review is to systematically search and meta-analyze commercial and improvised tourniquets for the outcomes of: arterial occlusion, application speed, and patient tolerance.

Methods: We searched MEDLINE, Embase, CINAHL, Cochrane Library, SPORTDiscus, and ProQuest Dissertations & Theses Global using controlled terms; without date limits. Manikin, animal, and operative studies were excluded. Tourniquet devices were pooled by design and compared. Data regarding provider training and experience, recipient anthropometrics, application site, ease of application, speed, tolerance, and device efficacy were examined.

Results: 5,169 studies were screened. The 36 included studies were prospective trials on healthy volunteers and published between 2000 and 2021. There were 8,205 unique tourniquet applications to 1,921 subjects using 23 unique commercial and improvised devices. Median

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sample size was 20 participants (IQR 26), ranging from 1 to 773 participants; and 102 (IQR = 152) applications ranging from 20 individual applications to 1,546 unique applications. The most commonly assessed outcomes were: rates of arterial occlusion (*n* = 30), pain (*n* = 18), speed of application (*n* = 13), and amount of mechanical advantage (e.g., Windlass turns) required (*n* = 13). Male participants outnumbered females 1,414 to 169, mean age ranged from 21 to 45 years of age. Devices were pooled into five categories according to mechanical advantage mechanism: elastic, friction, mechanical, pneumatic, and windlass. Initial hemostasis was achieved in 95% of upper extremity placements (CI = 0.89–0.98, *p* = 0.02), and 88% of mid-thigh applications (CI = 0.78–0.94, *p* <0.01). In both groups, pneumatic and mechanical tourniquet devices had the highest rates of success, with friction and elastic devices having the lowest rates of success. Meta-analysis showed that mechanical and pneumatic advantage systems had superior rates of hemostasis, ease of use, and pain tolerance scores. Due to study heterogeneity, we could not determine which devices were the fastest to apply. The overall risk of bias assessment for included studies found the certainty of studies ranged from moderate to critical.

Conclusion: In pre-clinical studies, mechanical and pneumatic advantage systems appear to be the superior tourniquet design. Due to the low certainty of evidence and non-randomizable nature of traumatic injury, pre-clinical tourniquet devices will likely continue to be tested on well volunteers. Adoption of a minimum data set, agreed upon definitions for testable metrics, and a standardized experimental design, could improve the comparability and quality of future tourniquet device studies.

Level of evidence: Systematic review, level IV.

Keywords: tourniquet, extremity, limb, injury, trauma

Background

Decades of controversy discouraged tourniquet use (Husum et al., 2004; Navein et al., 2003), which had been a hemorrhage control tool for hundreds of years (Forrest, 1982). Two decades of recent evidence; however, show tourniquets to be a safe and effective early intervention for extremity hemorrhage for injured adults in the military (Beekley et al., 2008; Lakstein et al., 2003), civilian care (Kauvar et al., 2018), and for children (Kragh et al., 2012). The controversy surrounding tourniquets has shifted from whether they are safe and effective, to which tourniquet design is superior, and what role improvised devices should play in patient care (Cornelissen et al., 2020; Stewart, et al., 2015). The Committee on Tactical Emergency Casualty Care (Callaway et al., 2011), American College of Surgeons (Hartford Consensus Group; Jacobs et al., 2015), and American College of Emergency Physicians (Bulger et al., 2014) all suggest commercial devices be used before improvised devices. Their recommendations are acknowledged to be based on weak evidence and grant that there may be limited role for improvised devices if commercial devices are unavailable. Others have argued that there will likely always be a need for improvised devices (Stewart et al. 2015), with recent reviews of improvised devices highlighting the need to examine differing designs (Cornelissen et al., 2020). There are dozens of commercially available generations and designs of tourniquet available (Martinson et al., 2020), and a potentially endless number of improvised designs. This abundance of tourniquet designs and the inherent difficulty in randomization of trauma patients to specific hemostasis devices necessitates pre-clinical trials to compare efficacy. Prior work and their cumulative endpoints have not been comprehensively compared.

Because of the challenges inherent in testing tourniquet designs in a clinical setting there will remain the need to examine devices in pre-clinical settings. This review gathered pre-clinical data from 2002-2021 to compare device designs and determine what data points are routinely reported and whether there is superiority to any specific design. The purpose of this review is to systematically search the literature and meta-analyze commercial and improvised device effectiveness for three outcomes of interest: rates of arterial occlusion, application speed, and patient tolerance.

Methods

This is a systematic review and meta-analysis of pre-clinical studies that examined extremity tourniquets. The review was registered (Picard & Douma, 2018) and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Page et al., 2021).

Literature search

We developed search strategies in conjunction with a library science information specialist (CP, MJD, JK) for the following databases: Ovid MEDLINE, Ovid Embase, CINAHL, Cochrane Library, SPORTDiscus, and ProQuest Dissertations & Theses Global. Search terms used in all databases included a combination of keywords and controlled vocabulary terms, with no date or language limits applied. The librarian (JK) strategically selected keywords based on the highest frequency that the keywords appeared in articles found in PubMed, which included "tourniquets hemorrhage" and "tourniquets arterial." To recover as many results in which tourniquets were used in non-surgical contexts, a modified version of a military medicine filter (Campbell, 2015) was included in the search strategy where possible. We searched for eligible studies published in the English language from database inception through July 2, 2020. An expanded grey literature search including targeted website searching, internet database searching, and grey literature database searching, was performed following previously published methods (Douma et al., 2020). The search was re-run

on June 7, 2021 to identify any new and potentially eligible research (Supplement 1). We also hand-searched bibliographies from previously published systematic reviews of tourniquets and hemorrhage control for eligible studies.

Review question

The review question was framed using the PICOST framework (Schardt et al., 2007).

Population: Healthy adult volunteers.

Intervention: Any tourniquet devices applicable for use by trained or untrained first aid providers including manufactured or improvised (not purpose-built or marketed as a hemorrhage control device) medical device tourniquets were assessed (intervention and comparison).

Comparison: Any comparison or tourniquet device.

Outcomes: Rates of arterial occlusion (determined by palpation, ultrasound, doppler, or plethysmography), time to hemostasis (how long after application it was measured), speed of application, and patient tolerance (defined using any validated pain scale). Secondary outcomes were ease of tourniquet use, method for determining hemostasis, training received, patient anthropometric data, and any other standard data reported.

Study design: Conference abstracts and trial protocols were excluded. All languages were included provided a peer-reviewed English translation was available. Inclusion criteria were pre-clinical studies that assessed any commercial or improvised tourniquet devices.

***Time*:** No date restrictions were applied.

Article screening and data extraction

Three reviewers (CP, DOD, MJD) independently and in duplicate, screened titles and abstracts, and subsequent full-text articles using Covidence (Melbourne, Australia). Any discrepancies between reviewers were resolved by consensus or independent arbitration.

Inclusion criteria

Because of the foreseeable need to continue with pre-clinical testing of tourniquet designs (due to the inherent challenges of comparing tourniquets on injured patients), the inclusion criteria for study design were set as pre-clinical studies that assessed any commercial or improvised tourniquet devices. Clinical cohort studies, case reports, case series, animal and manikin studies, and intra-operative applications of tourniquets were excluded. Studies of patients less than 18 years of age were excluded. Only English language studies were included.

Outcomes

Primary outcomes assessed included rates of arterial occlusion (determined by palpation, ultrasound, doppler, or plethysmography), time to hemostasis (how long after application it was measured), speed of application, and patient tolerance (defined using any pain scale). Secondary outcomes were ease of tourniquet use, method for determining hemostasis, training received, any patient anthropometric data collected, and any other standard data reported.

Data extraction

The same three reviewers (CP, DOD, MJD) independently and in duplicate, extracted data into a pre-piloted database (Excel; Microsoft Corporation, Redmond, WA). Extracted data included: study setting, study design, tourniquet devices assessed, sample size, participant demographics, anthropometrics, participant vital signs, the method for and location used to determine cessation of peripheral pulses, the technique for applying a tourniquet, skill/training level of tourniquet applier, extremity examined, successful occlusion rates, methods for determining arterial occlusion, tourniquet occlusion pressures, tourniquet application speed, time to arterial occlusion, perceived ease of tourniquet use, tourniquet breakage rate, and distress/pain caused by tourniquet application.

Data analysis and risk of bias assessment

Data analysis

Due to the wide variability in sample sizes, descriptive statistics were reported both as mean (M) and standard deviations (SD); and as median (Mdn) and interquartile ranges (IQR) for the study sample population size and characteristics of all studies. Due to the contextual heterogeneity of data, device-specific data were meta-analyzed only between: guided and unguided applications: guided applications had real-time ultrasound (visual or doppler) feedback during application; with only efficacy and pain level compared. Analysis was restricted to devices with a minimum: of 40 applications that had final arterial occlusion confirmed with some form of ultrasound (either colour flow, or audio doppler). Continuous outcomes were reported as mean differences (MD) with 95% confidence intervals (CIs).

We combined groups such as female and male, right and left for arm and leg measurements following formulations from the Cochrane Handbook (Higgins et al., 2019), and converted mean median IQR and Range to mean Median (McGrath et al., 2020) (Supplement 2). Data were transformed for the following variables: i) body mass index (BMI), which was reported in some papers instead of weight and height; ii) blood pressure (BP), BP was not always reported as systolic (SBP) and diastolic (DBP), some papers it is reported as mean arterial pressure (MAP) only; iii) numeric pain score (NPS) were not consistently recorded, for these we generated a vector, averaged the scores and converted scores to an 11-point (0–10) scale. Transformation formulas for BMI (Forbes et al., 2011; Papanicolaou, 2009), MAP (Gavish et al., 2008), and NPS are available in the supplemental materials (Supplement 2).

Dichotomous outcomes were reported as risk ratios (RR) and absolute risk reduction (ARR), with 95% confidence intervals. Random effects models were used, taking into account both within and between-study variability. We used the inverse variance method for continuous outcomes and the Mantel-Haenszel method for dichotomous outcomes. A p-value<0.05 was considered statistically significant. All meta-analyses were performed using Review Manager 5.3 (The Nordic Cochrane Centre, Copenhagen, Denmark, 2014). Heterogeneity was assessed by visual inspection of the forest plot, by using Chi^2 (with $p < 0.10$) to identify statistical significance, and the I2 statistic (I2 > 60%) to identify heterogeneity.

Risk of bias assessment

The risk of bias was assessed independently and in duplicate, for included studies by two reviewers (CP & DOD) with consensus arbitrated by a third reviewer (MJD). The risk of bias was assessed using the Cochrane Risk Of Bias In Non-Randomized Studies of Interventions (ROBINS-I) tool (Sterne et al., 2016).

Results

Studies identified

The final search identified a total of 9,236 results. 36 articles met full inclusion criteria; with one article excluded because it did not disclose the design of the tourniquet used (Ali et al., 2021) (Figure 1). Inter-rater agreement was fair to moderate between reviewer agreement (CP/MJD, κ=0.51; DOD/MJD, κ=0.37).

Characteristics of studies

All studies were prospective trials on healthy volunteers published between 2,000 and 2021. There were 8,205 unique tourniquet applications on 1,921 subjects. The mean sample size of included studies was 55.60 (SD = 130.39, Mdn = 20, IQR = 26) participants; with a mean of 210.91 applications (SD = 304.03, Mdn = 102, IQR = 152). Study sample sizes ranged from 1 participant (Kragh et al., 2019) to 773 participants (Weppner et al., 2013), and total tourniquet applications ranging from 20 individual applications (Peponis et al., 2016) to 1,546 individual applications (Weppner et al., 2013) (Table 1).

Participant data

Fourteen studies reported full demographic details including age, sex, limb circumference, and baseline vital signs (Table 1). Men outnumbered women 1,414 to 169, and the mean age of participants ranged from 21 to 45 years of age. 17 studies reported on height, weight, or BMI, 17 reported on limb circumference, and 17 reported full or partial baseline vital signs (Table 2).

Device data

There were 23 unique tourniquets evaluated. For the purposes of meta-analysis, devices were grouped by their mechanical advantage mechanism (elastic, friction, mechanical, pneumatic, or windlass) (Table 3). Although there may be changes in designs across generations, for the purpose of pooling data, all generations of any given commercial device were aggregated. Similarly, for improvised devices (blood pressure cuff, improvised windlass, surgical tubing, etc.), data were pooled irrespective of materials or brand used.

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Figure 1

Literature Screening and Inclusion Diagram

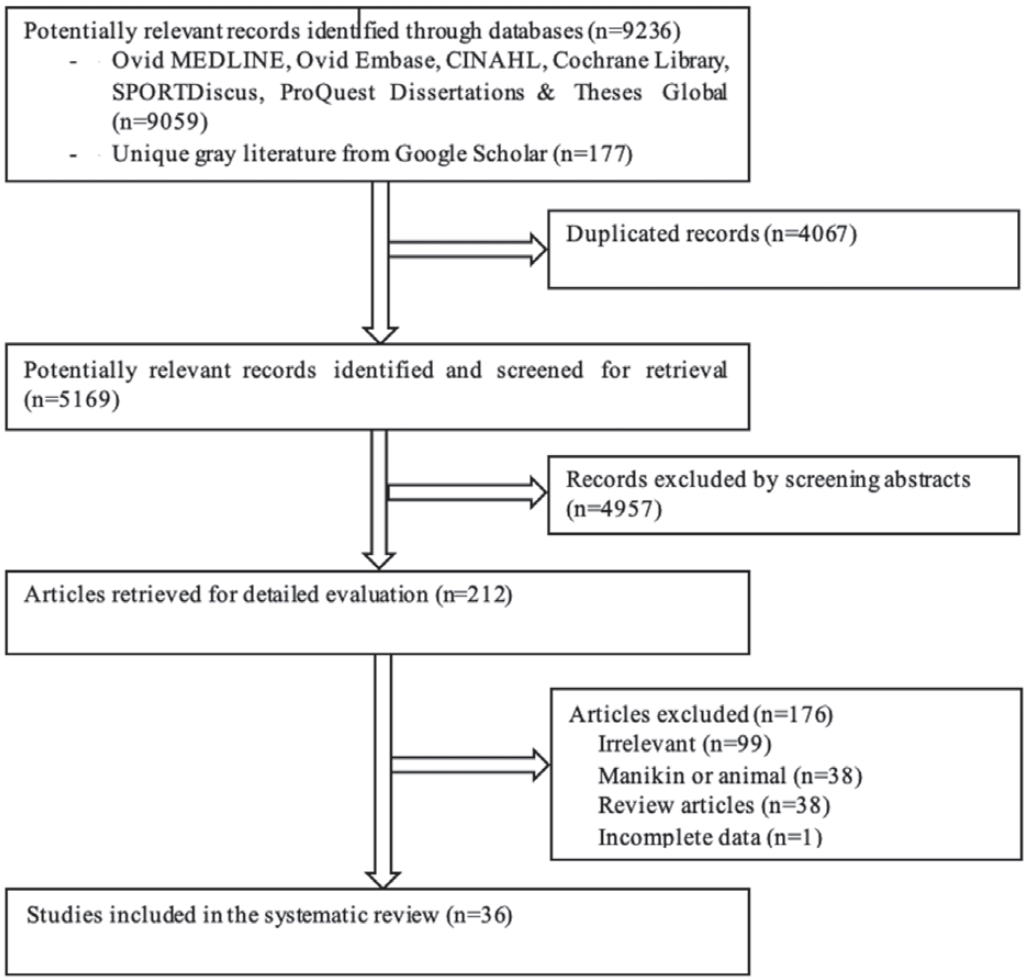


Table 1

Characteristics of Data Included in Studies

Author, year	Sample (*n*)	Applications (*n*)	Occlusion	Time of hemostasis	Application speed	Patient tolerance	Ease of use	Hemostasis assessment	Provider training	Anthropometrics	Other standardized reporting data
Alterie et al., 2018	41	708	Y	--	-	Y	-	D	Y	Y	Advantage
Beaven et al., 2017	12	24	Y	Y	Y	Y	-	U	Y	-	Advantage
Beaven et al., 2018	24	48	Y	-	Y	Y	-	U	Y	-	-
Beaven et al., 2021	12	24	Y	Y	Y	Y	-	D	Y	-	Breakage
Calkins et al., 2000	15	157	Y	Y	Y	-	-	P, D	Y	-	-
Childers et al., 2011	166	256	Y	Y	-	-	-	D	Y	-	Advantage, breakage
Guo et al., 2011	20	200	Y	-	Y	Y	Y	D	Y	Y	-
Heldenberg et al., 2015	23	828	Y	-	-	Y	Y	D, P	Y	-	-
Higgs et al., 2016	40	40	Y	Y	Y	-	-	P	Y	-	-
Jaffer et al., 2012	58	116	Y	Y	Y	Y	-	S, U	Y	Y	-
King et al., 2006	10	100	Y	-	Y	Y	Y	D, P	Y	-	-
Kragh et al., 2019	1	100	-	-	-	-	-	-	Y	-	Breakage
Martinez et al., 2018	50	102	Y	-	Y	-	-	U	Y	-	-
Peponis et al., 2016	20	20	Y	-	-	-	-	P, S, U	Y	-	Advantage
Sanak, 2017	24	24	Y	-	-	-	-	U	Y	-	-
Savage et al., 2013	22	65	Y	-	Y	Y	Y	D, P	Y	-	Advantage
Schreckengaust et al., 2014	89	-	Y	Y	Y	-	-	D	Y	-	-
Slaven et al., 2015	12	24	Y	Y	-	Y	-	D	Y	-	Advantage, breakage, skin pressure
Swan et al., 2009	10	120	Y	-	-	Y	Y	D	-	-	-
Taylor et al., 2011	24	72	Y	-	-	-	-	D	Y	-	-
Unlu et al., 2015	52	306	Y	-	Y	-	-	U	Y	Y	Advantage
Unlu et al., 2017	145	188	Y	-	-	-	-	U	Y	-	Advantage
Vuillemin et al., 2018	72	72	Y	-	Y	-	-	U	Y	-	-
Wall, Buising, Grulke, et al., 2017	15	60	Y	Y	-	Y	-	D, S	Y	Y	Advantage, skin pressure
Wall, Buising, Nelms, et al., 2017	15	293	Y	Y	-	Y	-	D	Y	Y	Advantage, skin pressure
Wall et al., 2013	17	187	Y	Y	-	Y	Y	D	Y	Y,	Advantage, skin pressure
Wall et al., 2014	16	192	Y	Y	-	-	-	S, U	Y	Y	Advantage, skin pressure
Wall et al., 2015	16	151	Y	Y	-	Y	-	D	Y	Y	Advantage, skin pressure
Wall et al., 2016	16	96	Y	Y	-	Y	-	D	Y	-	Breakage, skin pressure
Wall et al., 2019	22	400	Y	-	-	Y	-	S	Y	-	Breakage, skin pressure
Wall et al., 2020	28	225	Y	-	-	Y	-	S	Y	-	Breakage, skin pressure
Wall, Welander, Sahr, et al., 2012	15	90	Y	Y	-	Y	Y	D	Y	Y	-
Wall, Welander, Singh, et al., 2012	15	30	Y	Y	Y	Y	Y	D	Y	Y	-
Walters et al., 2005	18	174	Y	-	-	Y	-	D	-	Y	-
Wenke et al., 2005	26	22	Y	Y	-	-	-	D, S	-	Y	-
Weppner et al., 2013	773	1546	Y	-	-	-	-	D	Y	Y	Advantage, breakage

Abbreviations – D- Doppler (audible), N- No, P- Palpation, Ultrasound (visual), S- Plethysmography (SpO2), Y- Yes

Table 2

Participant Characteristics and Anthropometrics

First author, year	Age	Male (%)	Wt. (Kg)	Ht. (cm)	BMI	Leg circ (cm)	Arm circ (cm)	HR (/min)	SBP (mmHg)	DBP (mmHg)	MAP (mmHg)
Alterie et al., 2018	31.4 (6.9)	28 (68.3)	-	-	-	-	-	-	-	-	-
Beaven et al., 2017	31.5 (5.2)	10 (83.3)	-	-	-	-	-	-	-	-	-
Beaven et al., 2018	39.2 (18)	20 (83.3)	-	-	-	-	-	-	-	-	-
Beaven et al., 2021	29.6 (5.4)	12 (100.0)	-	-	-	-	-	-	-	-	-
Calkins et al., 2000	-	-	-	-	-	-	-	-	-	-	-
Childers et al., 2011	21 (3.1)	166 (100.0)	79 (9.8)	176 (9)	26 (4.2)	61 (5.3)	-	69 (12.7)	124 (13.6)	68 (10)	48 (8.7)
Guo et al., 2011	22.5 (3.6)	12 (60.0)	61.5 (10.4)	170.2 (3.6)	21.2 (3.3)	47.5 (6.8)	25.1 (3.3)	77.8 (10.4)	123.6 (16.4)	69 (9.8)	47.7 (9.2)
Heldenberg et al., 2015	21 (2.9)	23 (100.0)	-	-	-	-	-	-	-	-	-
Higgs et al., 2016	34 (12.2)	32 (80.0)	-	-	-	-	-	-	-	-	-
Jaffer et al., 2012	22.5 (2.3)	35 (60.3)	74 (11.4)	175.7 (11.1)	24 (2.6)	44.5 (4.6)	-	75.2 (6.7)	119.4 (3)	76 (5.9)	43.7 (4.2)
King et al., 2006	-	-	-	-	-	-	-	-	-	-	-
Kragh et al., 2019	-	-	-	-	-	-	-	-	-	-	-
Martinez et al., 2018	25.9 (3.1)	-	-	-	-	-	-	-	-	-	-
Peponis et al., 2016	33.9 (9.7)	11 (55.0)	-	-	26.4 (0)	-	-	-	-	-	-
Sanak, 2017	-	-	-	-	-	-	-	-	-	-	-
Savage et al., 2013	-	-	-	-	-	-	-	-	-	-	-
Schreckengaust et al., 2014	-	-	-	-	-	-	-	-	-	-	-
Slaven et al., 2015	33.2 (13.8)	7 (58.3)	-	-	-	52.9 (7.5)	-	-	114.7 (13)	-	-
Swan et al., 2009	36.5 (6)	-	69.8 (5.4)	173 (4)	23.3 (1.7)	-	-	-	123 (6)	72 (4)	43.7 (3.6)

continued…

First author, year	Age	Male (%)	Wt. (Kg)	Ht. (cm)	BMI	Leg circ (cm)	Arm circ (cm)	HR (/min)	SBP (mmHg)	DBP (mmHg)	MAP (mmHg)
Taylor et al., 2011	36 (0)	-	-	-	-	-	-	-	-	-	-
Unlu et al., 2015	24.5 (3.8)	-	-	-	23.5 (2.3)	49.6 (5)	39 (11.3)	-	-	-	92.7 (0)
Unlu et al., 2017	32 (7)	145 (100.0)	-	-	25 (1.8)	56.8 (4)	-	-	-	-	88.7 (0)
Vuillemin et al., 2018	27.1 (4.7)	71 (98.6)	-	-	23.8 (0)	54.4 (0)	-	-	-	-	-
Wall, Buising, Grulke, et al., 2017	29.6 (15.2)	7 (46.7)	-	-	-	51.2 (5)	27.6 (4.1)	-	102.4 (10.5)	63.7 (8.4)	39.7 (7.1)
Wall, Buising, Nelms, et al., 2017	29.5 (14.9)	8 (53.3)	-	-	-	-	-	-	111.3 (11.7)	66.5 (8.4)	42.9 (7.4)
Wall et al., 2013	26.8 (12.3)	6 (35.3)	75.4 (18.2)	169.3 (12.7)	26.2 (4.1)	48 (6.7)	28.5 (5.8)	-	116.6 (0)	60 (0)	-
Wall et al., 2014	29.1 (13)	7 (43.8)	72 (18.2)	172.6 (12.5)	24.2 (3.8)	52 (7.5)	29.9 (5)	-	107.5 (13)	71.9 (13)	44.5 (10.4)
Wall et al., 2015	29.4 (13.5)	8 (50.0)	76.1 (14.8)	172 (12.5)	25.7 (3.1)	37.9 (3.5)	24.9 (3.4)	-	108.3 (13.5)	-	-
Wall et al., 2016	45 (31)	8 (50.0)	-	-	-	53.3 (3.8)	29.9 (5.6)	-	119 (0)	70.5 (0)	-
Wall et al., 2019	-	6 (30.0)	-	-	-	47.1 (0)	-	-	-	-	-
Wall et al., 2020	31.1 (17.4)	3 (23.1)	-	172.5 (12.5)	-	52 (6.5)	-	-	113 (15.2)	-	-
Wall, Welander, Sahr, et al., 2012	22.9 (6.6)	8 (53.3)	71.4 (16.6)	174.1 (10.3)	23.3 (3.4)	51.1 (3)	29.2 (4.4)	74.5 (12.5)	-	-	-
Wall, Welander, Singh, et al., 2012	21 (1)	8 (53.3)	75.9 (22.5)	175.6 (11.9)	24.4 (4.7)	49.1 (6.3)	29.1 (4.2)	78.5 (13.5)	128.5 (13.6)	81.3 (11.1)	49.9 (9.1)
Walters et al., 2005	35.3 (7.2)	16 (88.9)	83.4 (10.5)	177 (6.9)	26.6 (2.8)	59.5 (4.5)	34 (4.1)	65 (8.8)	122 (6.9)	75 (8.8)	46.7 (6.7)
Wenke et al., 2005	23 (1)	17 (65.4)	82.5 (2.8)	176 (2)	26.6 (0.9)	59.8 (1)	32.5 (0.6)	67 (3)	117 (3)	64 (3)	41 (2.4)
Weppner et al., 2013	21.7 (3)	773 (100.0)	88.4 (10.9)	177.6 (6.3)	28 (3)	60.7 (5)	-	67.8 (11.3)	119.8 (14.6)	77.3 (8.6)	45.6 (8.1)

Table 3

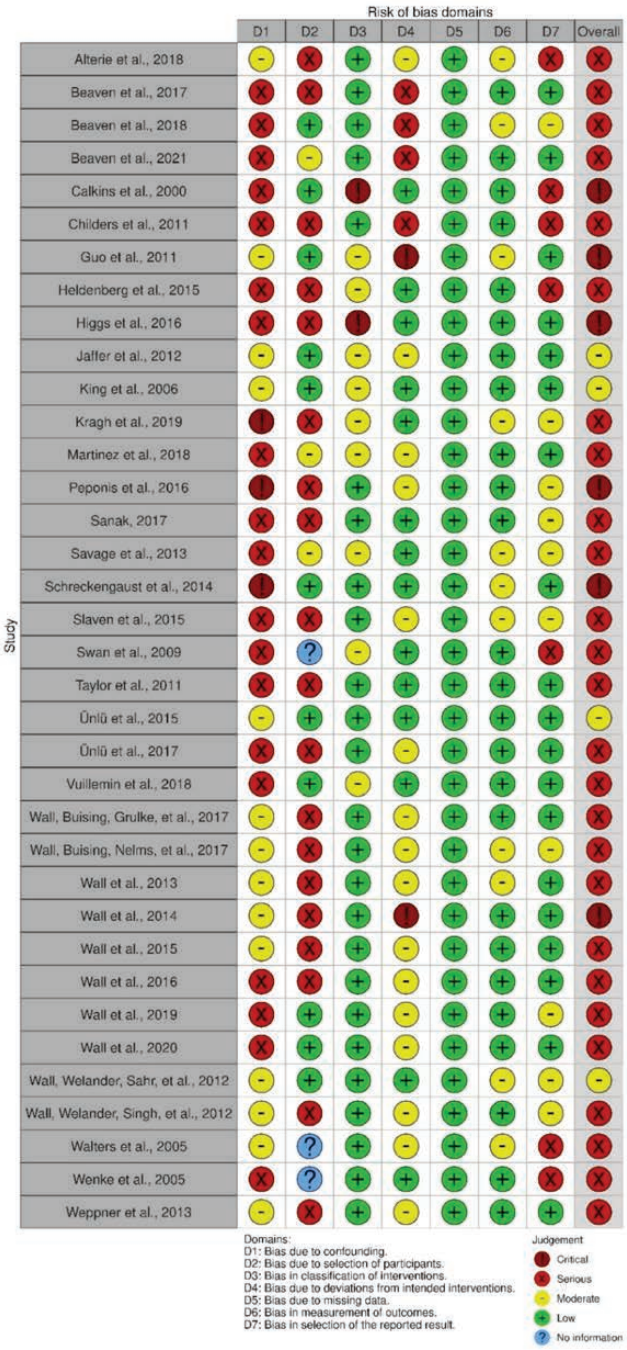
Device Characteristics by Mechanical Advantage Mechanism

Mechanism	Device name and manufacturer
Elastic	Stretch Wrap and Tuck Tourniquet[1] (SWAT-T™; H&H Medical Corp) "Ribbed Elastic Band" (Manufacture data not provided) Multipurpose Emergency "Israeli" Bandage (First Care Products, Jerusalem, Israel) Surgical Tubing[2] (Manufacture data not provided)
Friction	"Half Hitch" (Manufacture data not provided) Canvas Belt[3] (Manufacture data not provided) The One-Handed Tourniquet[1] (OHT; Hemodyne, Inc.)
Mechanical	"Ladderlock and Ratchet" (Manufacture data not provided) Ratcheting "Cargo Strap" (Manufacture data not provided) Self-Applied Tourniquet System[1] (SATS; Tactical Medical Solutions, LLC) Ratcheting Medical Tourniquet[1] (RMT; m2® inc.,) Last Resort Tourniquet (Hammerhead, LLC.)
Pneumatic	Pneumatic Tourniquet (Stryker® Single-Belly Pneumatic Tourniquet; Sustainability Solutions "Bladder Tourniquet" (Manufacture data not provided) Emergency Medical Tourniquet[1] (EMT; Delfi Medical Innovations, Inc) Sphygmomanometer (BP Cuff)[1] (Propper, Rankin Biomedical, Holly, MI; AllHeart, Louisiana, Missouri; Hokanson, Bellevue, Washington)
Windlass	Combat Application Tourniquet[1] (C-A-T®; North American Rescue Products Inc) "CT" Tourniquet (Manufacture data not provided) Improvised Russian Tourniquet[3] (wooden rod and cloth bandage) Special Operations Force Tactical Tourniquet[1] (SOFTT; Tactical Medical Solutions LLC) The Mechanical Advantage Tourniquet (Bio Cybernetics International) Windlass Tourniquet (Military Medical Equipment Research Institute; Tianjin, China) Tactical Mechanical Tourniquet1 (TMT; Alphapointe™)

[1] Different models and generations are pooled
[2] Different lengths and widths of tubing are pooled
[3] Different lengths of dowel and bandage are pooled

Table 4

Risk of Bias Assessment



Twelve studies placed tourniquets directly on skin, 11 placed tourniquets over clothing, and eight studies did not report this data. Researchers applied tourniquets in 13 studies, participants applied tourniquets in 20 of the studies, and in two studies tourniquets were applied by both. Of the studies where participants applied the tourniquets, four did not report on either participant training or experience level.

Tourniquet application data

Initial arterial occlusion measurement

Arterial occlusion was measured immediately after tourniquet placement in all 14 studies, except for one study which delayed initial assessment for 60 seconds (Wall et al., 2016). There were nine studies that monitored to ensure that hemostasis was maintained: these repeated measures were taken at 30 seconds (Childers et al., 2011), 60 seconds (Swan et al., 2009; Wall et al., 2013; Wall, Welander, Sahr, et al., 2012; Wall, Welander, Singh, et al., 2012), 90 seconds (Peponis et al., 2016), and 120 seconds (Wall, Buising, Nelms, et al., 2017; Wall et al., 2015, 2016). The most common method for assessing hemostasis was using doppler ultrasound (Table 2). The most common location to assess for mid-thigh applications was the dorsal pedal artery and the most common location to assess upper extremity placement was at the radial artery (Supplement 3). In 19 studies the application of the tourniquet was guided by ultrasound (the device was tightened until obliteration of pulses) (Supplement 3).

Initial hemostasis was achieved in 88% of mid-thigh applications (CI = 0.78–0.94, $p < 0.01$), and 95% of upper extremity placements (CI = 0.89–0.98, $p = 0.02$) although we were unable to pool results by tourniquet design in either group due to heterogeneity. For the mid-thigh applications there was significant within-group variability (I^2 = 85–99%) and between-group heterogeneity (I^2 = 98%, $p < 0.01$) (Figure 2). For arm applications there was also significant within-group heterogeneity (I^2 = 0–96%); between-group heterogeneity was more moderate (I^2 = 33%), but failed to achieve statistical significance ($p = 0.06$) (Figure 3). In light of the heterogeneity no between-group pooling was attempted and we are unable to determine if there is any significant difference in the rates of arterial occlusion by device.

Speed and ease of application

Although speed of application was reported in 19 studies (Table 1), there are significant differences in how speed was determined. Start time definitions varied: from the beginning of a clinical scenario (to examine delays due to uniform design) (Higgs et al., 2016; Martinez et al., 2018), or beginning of the device application (Guo et al., 2011). End time definitions were defined as: when the provider was satisfied with device placement (Guo et al., 2011), or as devise the point when final corrections were made to improperly tensioned device placements (Unlu et al., 2017). Due to the considerable heterogeneity, there was no attempt made to pool the results.

Figure 2

Hemostasis Rates for Tourniquets Applied at Mid-Thigh

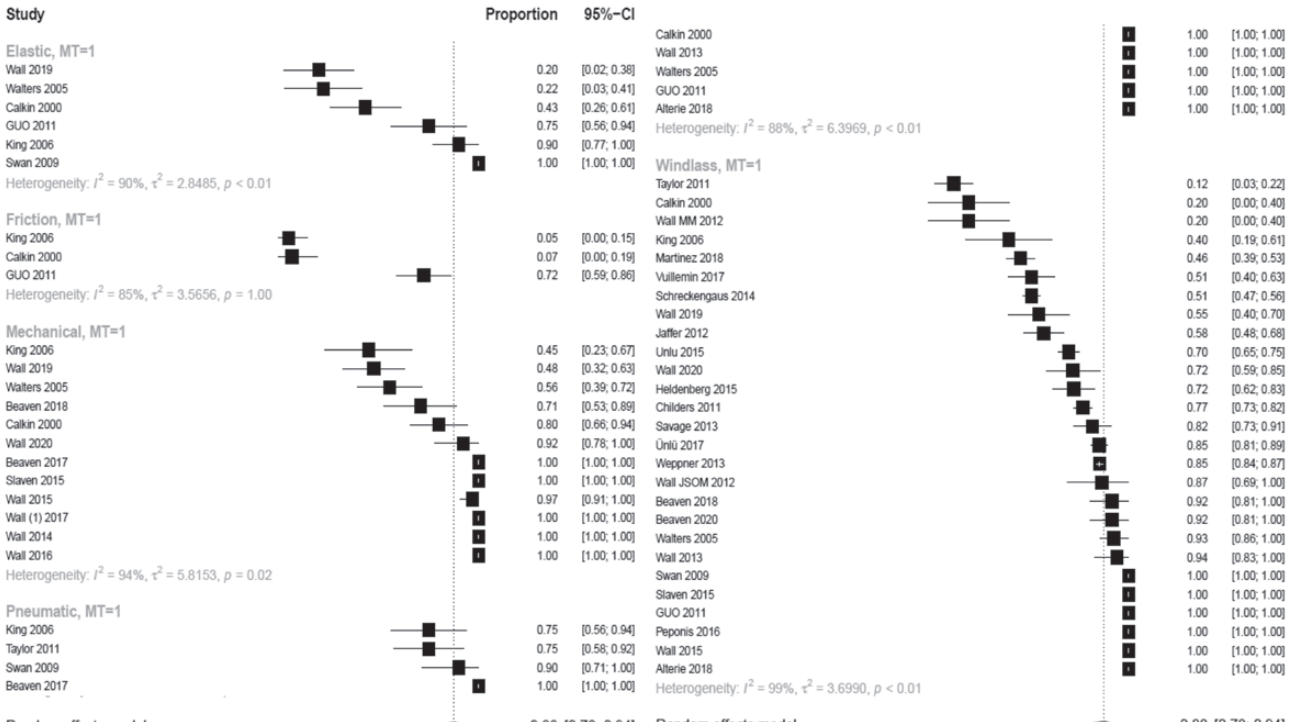
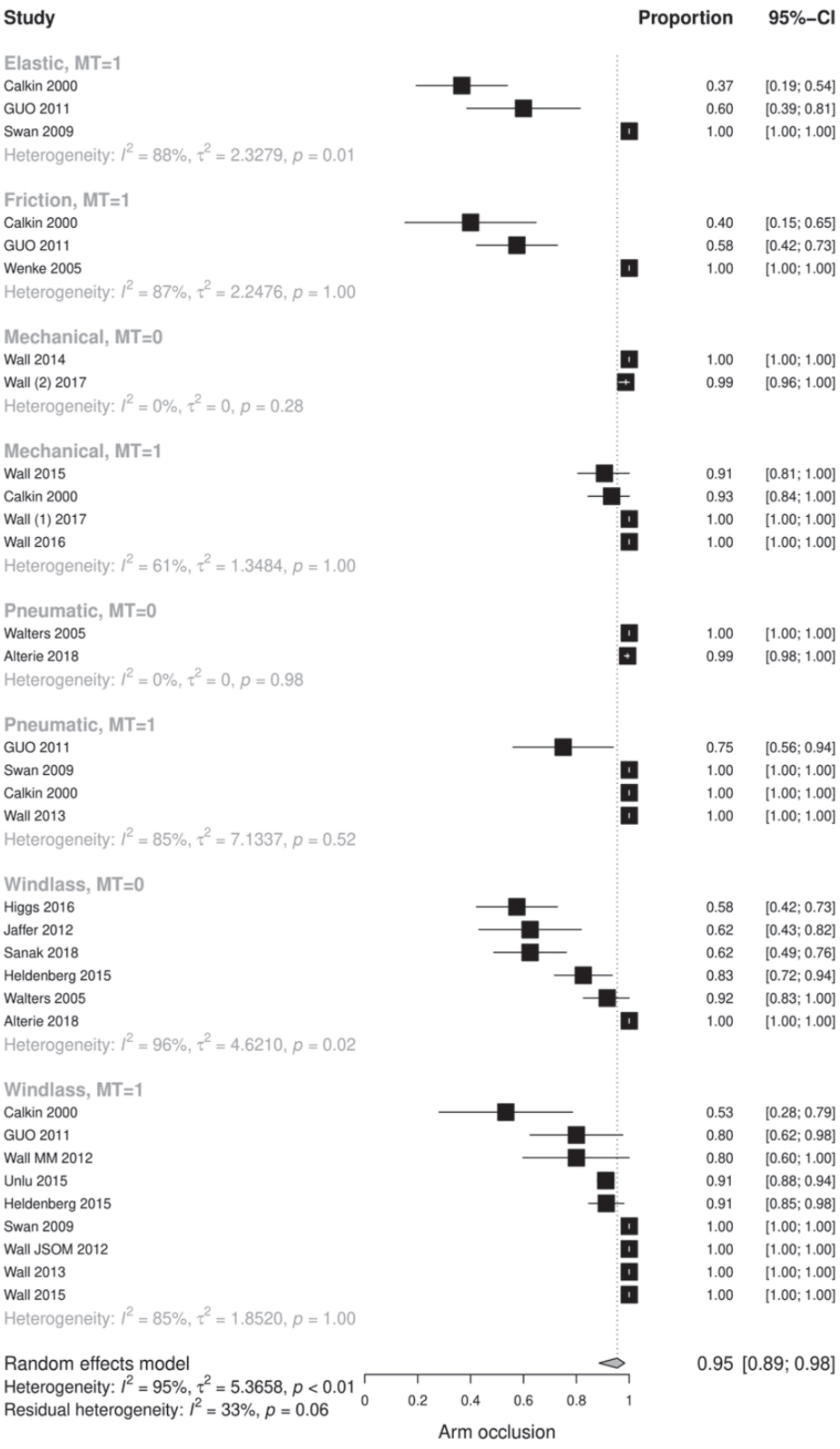


Figure 3

Hemostasis for Tourniquets Placed on the Arm



Note: "MT=0"-Non-mid-thigh application; "MT=1"-Mid-thigh application

Ease of application was examined in a minority ($n = 8$) of studies (Table 1). When studies are examined individually application difficulty ranged between 2.05 and 9.83 (on a 0–10 scale) (Figure 4); however, due to the significant heterogeneity in the studies (within group, $I^2 = 66–98\%$; between group, $I^2 = 99\%$, $p < 0.01$) we were unable to pool results by tourniquet design or comment on whether or not there is any device superiority (Figure 4).

Patient tolerance

21 studies assessed the pain levels associated with tourniquet application (Table 1). There range of reported pain varied from 0.75 to 6.60 (on a 0–10 scale) for individual studies (Figure 3). Pain scores varied dramatically between studies for similar tourniquet designs. There was significant study heterogeneity both within groups ($I^2 = 73–98\%$) and between groups ($I^2 = 98\%$) so further pooling was not attempted (Figure 5), as such we cannot make recommendations on the most tolerable design.

Training received

There was some level of training to apply tourniquets discussed in all but two included studies (Walters et al., 2005; Wenke et al., 2005). Training ranged from timed sessions with provider practice until comfort was achieved (Guo et al., 2011), to simply providing product instructions for use (Savage et al., 2013), and at worst some cases included remedial training (Martinez et al., 2018; Wall, Welander, Singh, et al., 2012). Baseline training may have influenced the training standards and providers ranged in skill from unskilled novices (Unlu et al., 2015) to experienced combat pre-hospital providers "medics" (Savage et al., 2013) or research staff. However, only one study attempted to correlate provider training, experience, and education level with the ability to correctly place tourniquets (Vuillemin et al., 2018).

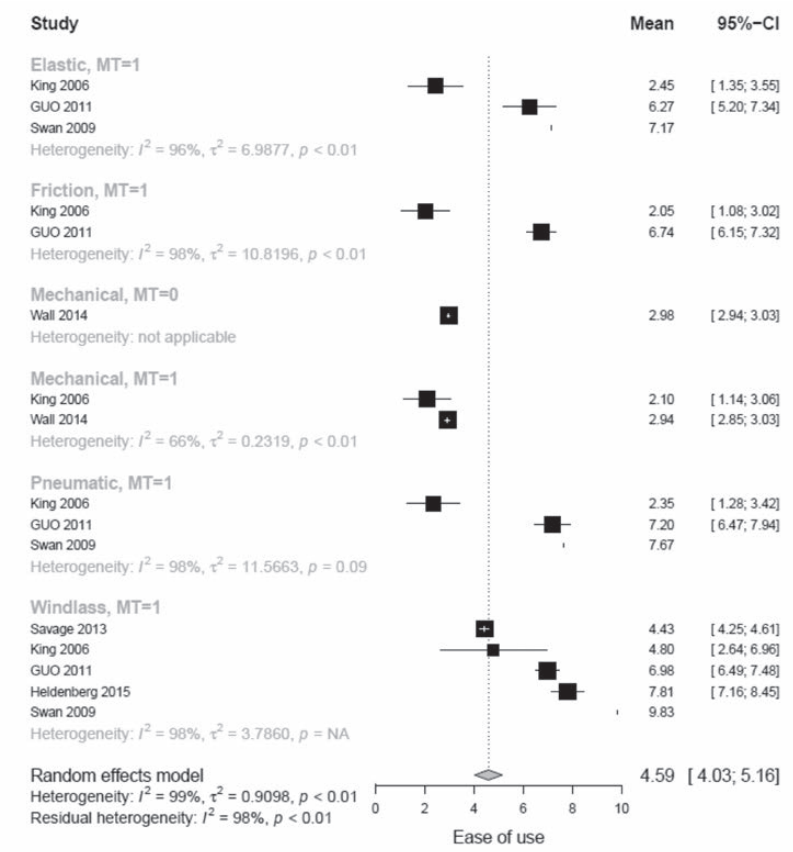
Other standardized data reported

Other standardized data that were collected included provider empathy scores (Vuillemin et al., 2018); items from a novel skill performance tools (Martinez et al., 2018); whether the device was applied directly to skin, normal uniform material, or heavier personal protective equipment (Supplement 3). The most commonly reported additional standardized data were the amount of mechanical advantage required, the frequency of device breakage, and the final pressure applied beneath the tourniquet devices (Table 2).

Advantage (Degree of mechanical advantage). Advantage was quantified as total degrees (or turns) of the windlass, number of wraps for elastic, tooth advances for mechanical devices, and inflation pressure for pneumatic devices (Supplement 3). There was significant variation in how authors defined the mechanism action with some devices such as windlass and elastic tourniquets needing significant movement (180 degree wraps or turns) between each increment, while others could be adjusted in

Figure 4

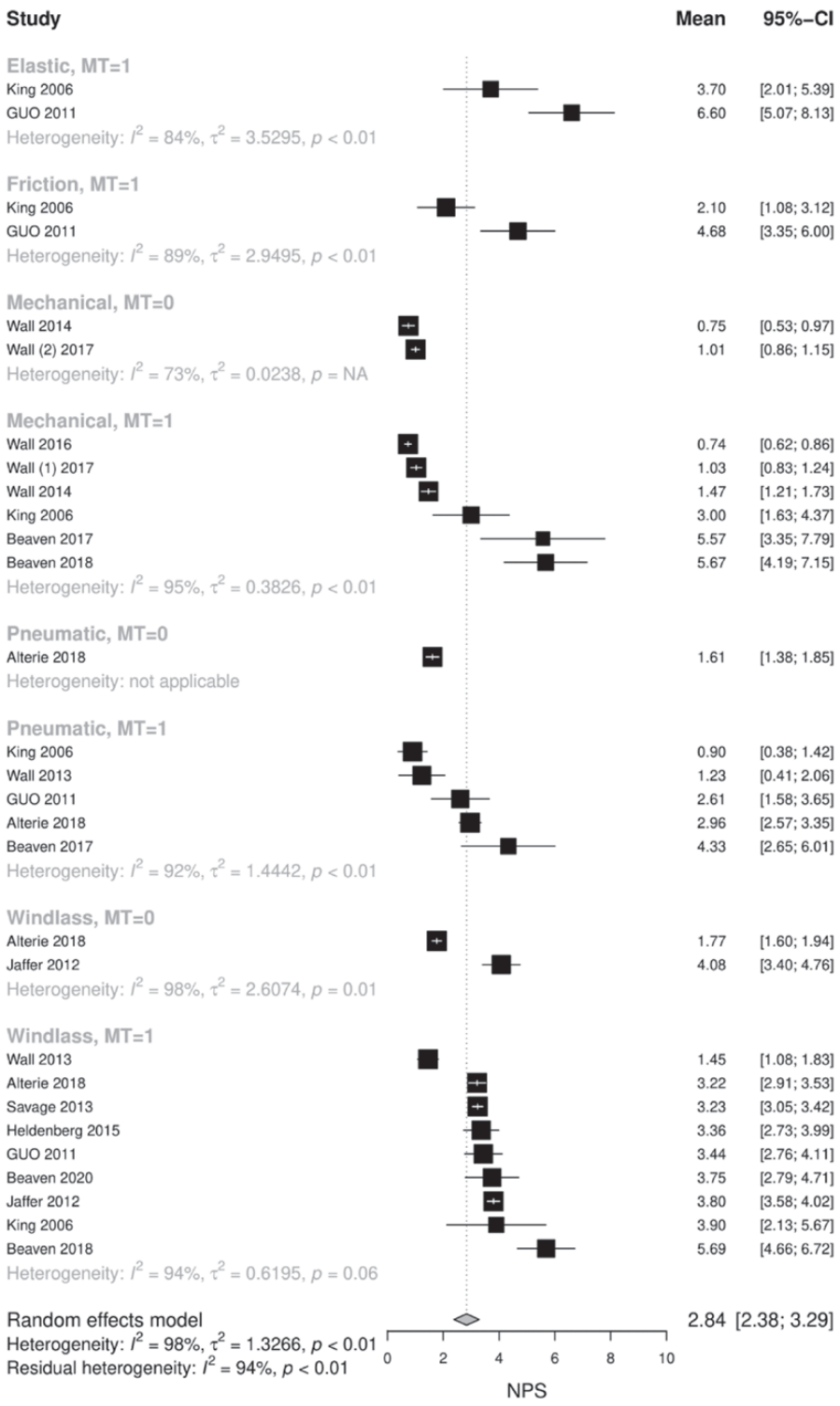
Ease of tourniquet use by tensioning system design



Note: "MT=0"-Non-mid-thigh application; "MT=1"-Mid-thigh application

Figure 5

Pain score according to tourniquet tensioning system



Note: "MT=0"-Non-mid-thigh application; "MT=1"-Mid-thigh application

much smaller increments (ladder lock and pneumatic devices). Furthermore, the total amount of mechanism action may have been significantly affected by initial tensioning pressure.

Breakage or device failures. Failures were noted in 8 studies. Device failures included mechanical teeth skipping (Wall et al., 2015); windlass, strap or baseplate failure (Beaven et al., 2021) biological, radiological or nuclear (CBRN, or extensive device deformation (Slaven et al., 2015)50, 75, 100, 125, 150, 175 (CAT only. Failure rates were not compared because some devices were used extensively (Slaven et al., 2015) 50, 75, 100, 125, 150, 175 (CAT only, exposed to environmental degradation (Childers et al., 2011; Weppner et al., 2013)1st Battalion, 6th Marines reported a 10% (10/92, and while both of these conditions significantly increased the likelihood of failure, they were not consistently reported in the literature.

Skin surface pressure. Below tourniquet pressure was examined in 8 studies (Table 1). In all 8 studies pressure measurements were made using pneumatic cuffs (Supplement 3) placed under the device. Although the results were not pooled for meta-analysis included studies found that occlusion pressured were not adversely affected by initial tensioning pressure (Slaven et al., 2015) 50, 75, 100, 125, 150, 175 (CAT only, and that uniformly windlass tourniquets had the highest occlusion pressures. Sub-tourniquet tissue pressures have been linked to complication rates in the surgical literature (Mohler et al., 1999; Ochoa et al., 1972) and with the heterogeneity noted in the literature reviewed, this is likely a compelling area for further review in patients who receive emergency tourniquets.

Quality assessment

We evaluated the risk of bias in all 36 studies using the Cochrane Risk Of Bias In Non-Randomized Studies of Interventions (ROBINS-I) tool (Sterne et al., 2016). Overall, the certainty of the evidence was judged to be very low to moderate across all outcomes (Supplement 4) due to a lack of random sequence generation in randomized studies (selection bias), a lack of allocation concealment in non-cross over trials (selection bias), and the inability to blind participants and outcome assessors (performance and detection bias). Despite the large degree of homogeneity in the study populations, there were both skew and heterogeneity noted in the published studies suggesting that there may have been systematic bias towards an under reporting of pain (potentially due to attrition bias) and wide heterogeneity in the collection of ease-of-use outcomes (Supplement 5).

Discussion

Included studies

This review was mostly of low quality pre-clinical studies with wide variations in their samples, study designs, and data collection parameters. Although there have been data collection recommendations in place since the 2010 Quantico Tourniquet Summit (Tourniquet working group, 2010), these are not widely followed. Previous authors who have reviewed tourniquet use have called for data registries (Kauvar et al., 2018) to address discrepancies in data reporting. We would add that authors should consider using reporting guidelines (Reeves & Gaus, 2004) and formalization of data collection recommendations through consensus with civilian and military stakeholders to determine tourniquet specific reporting items are needed.

Participant data

There were significant differences in the degree of training received between groups who applied tourniquets. Within studies that compared providers with different skill levels, higher skilled providers ("medics") tended to have higher tourniquet application success than lower skilled providers (soldiers) (Heldenberg et al., 2015). Likewise, time from the last training session and having received additional training (Martinez eat al., 2018; Wall, Welander, Singh, et al., 2012) Wrap, and Tuck Tourniquet (SWAT-T also seemed to improve tourniquet application success. Baseline skill and training may have contributed significantly to overall placement success and limit the degree of internal comparability for included studies.

There is both an over-representation of men and an under-collecting of baseline anthropometric data in the included studies. As baseline blood pressure increases so too would the required tourniquet pressure needed to interrupt that flow. Additionally, previous research suggests that increasing muscle mass (Wall et al., 2016) 5.1cm-wide, and side-by-side-3.8cm-wide non-elastic strap-based tourniquets.MethodsRatcheting Medical Tourniquets (RMT and limb circumference (Shaw & Murray, 1982) may decrease tourniquet effectiveness. The lack of limb circumference and blood pressure data limits the degree to which these data can be compared internally. The over-representation of men in the sample may limit the degree of external generalizability to civilian settings.

Device data

There were differences not only in the generation of devices used, but also in the number of times that a device was used. Some studies reported that devices had never been used (Childers et al., 2011), other studies used devices that had been used extensively (over one hundred previous applications) (Wall et al., 2020) or times prior to the study and these device experience? differences may have affected performance. Previous research has shown that repeated use of windlass style tourniquets may result in internal band stretch and decreased efficiency (Polston et al., 2013), as well as increased device breakage rates. Some of the improvised devices may have been limited by having been of an inadequate size: Guo et al (2011) used latex tubing lengths that were significantly shorter (50cm versus 150cm) than what was used in other studies (King et al., 2006) and blood pressure cuff inflation targets (50mmHg) that are much lower than an expected systolic blood pressure in a healthy participant. Additionally, for those studies that did assess improvised tourniquets there may have been considerable difference in the quality of construction materials but not all studies specified the materials used.

Measuring arterial occlusion

Although there is some consensus that doppler assessment should be the standard method (TNCC updates 2010), there were differences in location, timing, and methods for determining cessation. Studies used various locations for assessing pulses

(Supplement 3), used more examinations with higher predictive levels (ex: palpation versus color or flow ultrasound) which could falsely skew the results. Additionally, delayed assessment could result in artificially high failure rates given that there is an anticipated and predictable loosening of the tourniquets either though device slippage and leak or through muscle relaxation (Wall et al., 2016).

Speed and ease of application

Although speed of placement is certainly a concern in clinical practice there was a high degree of inconsistency in how this was evaluated between studies. Differences in determining start (Wall et al., 2016) and stop times (Childers et al., 2016; Swan et al., Peponis et al., 2016; Wall et al., 2016), differences in tourniquet accessibility (Higgs et al., 2016; Martinez et al., 2018), or application technique (ex: one-handed) would all have significant impacts on the speed and ease of application.

Patient tolerance

While many studies discussed pain during tourniquet application, most discussed this as an unavoidable complication, and one that would be of less concern given the "life-or-limb" scenario typically present in injuries requiring tourniquet for hemorrhage control. Framing the discussion as life over limb (and suffering), however, fails to acknowledge that in pre-clinical research the severe pain (inability to tighten due to pain) was a failure criteria for many studies (Beaven et al., 2017, 2018, 2021; Swan et al., 2009; Wall et al., 2013; Wenke et al., 2005)we measured the effects of three common tourniquets on arterial pulses (Doppler signals. These pre-clinical failures are telling and suggest that there is likely a meaningful clinical consequence to not attending to discomfort. Indeed, in a study that compared guided versus unguided applications of windlass tourniquets the authors noted that applications guided by ultrasound had not only higher occlusion rates, but also significantly higher pain scores (Jaffer et al., 2012). The relationship between pain and occlusion rates may negatively affect success if severe pain may become a barrier for patients and providers. Indeed, this was the case in one of the trials which noted that participants with the highest empathy scores also tended to have the lowest initial success rates with tourniquet application (Vuillemin et al., 2018)and tourniquet application is one of the most critical lifesaving interventions on the battlefield. However, previous studies have shown high failure rates in tourniquet application. Our study aimed to assess the correlation between personality traits that may interfere with effective tourniquet application in a simulated extremity hemorrhage. Materials:Seventy-two French soldiers, previously trained to forward combat casualty care, were evaluated by self-administered questionnaires and submitted to the simulation in group of six. We focused on measuring the empathic personality of the subjects, their peer-to-peer relationships (altruism. The relationship between patient tolerance and tourniquet success is likely under-studied and pain should be included as a standardized data collection point in future research.

Practically speaking, when faced with life-threatening extremity hemorrhage, the best tourniquet is the one that is available to the rescuer. However, for decision-makers and individuals determining which device to obtain and train with, the choice of device can be a challenge. This review and meta-analysis challenges conventional wisdom. For over twenty years the windlass style devices, optimized for one-handed application and care-under-fire scenarios have emerged as the industry standard, despite evidence they may take longer to apply and have a higher failed application rate. For resource limited and space limited settings, the use of a multi-purpose device such as a manual blood pressure cuff may be the best device, as long as potential rescuers train how to use the device for this purpose. For two handed civilian application, elastic devices may be superior.

Limitations

As described above, our systematic review and meta-analysis was challenged by significant methodological and clinical heterogeneity among the included studies. Various tourniquet devices were used, devices were not applied or evaluated consistently, significant data transformation was required, all of which increased heterogeneity. Study quality varied and it is questionable whether evidence provided by healthy volunteer studies can be applied to life-threatening hemorrhage scenarios. Grouping of devices regardless of production model may have influenced results, likewise there may have been differences between individual devices within similar advantage categories that are not fully captured in our analysis.

Conclusion

We searched six databases to inform our meta-analysis of commercial and improvised hemorrhage control tourniquet device effectiveness for three outcomes of interest: arterial occlusion, application speed, and patient tolerance. Data from 23 unique devices, 8205 applications and 1921 subjects were analyzed. Four main device types were identified: windlass, mechanical, pneumatic, and friction. Pooled results studies favoured pneumatic and mechanical tourniquet devices for effectiveness of arterial occlusions. Due to methodological heterogeneity, we could not conclude with certainty which devices were reliably the fastest to apply. There was some signal from the included studies that simple mechanical devices were the easiest to apply and windlass were the most difficult. The most painful tourniquets were device utilizing elastic tensioning systems, the least painful tensioning systems were mechanical. We recommend the adoption of a minimum dataset, agreed upon definitions for testable metrics, and a standardized experimental design (with randomization) to improve the comparability and quality of future tourniquet device studies.

Implications for emergency nursing practice

1. Tourniquets are commonly used but the data comparing individual devices comes from pre-clinical studies and these are of generally poor quality and cannot easily be compared.
2. Practice guidelines that call for specific designs of tourniquet may not be based on patient-specific outcome measures or from between-device comparisons
3. Further research is needed to create a standardized method for assessing and reporting data elements in pre-clinical tourniquet device comparison studies.

About the authors

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None

Conflicts of Interest

None

Credit statement

Christopher Picard: Conceptualization, methodology, investigation, data curation, writing – original draft, writing – reviewing and editing, visualization, project administration.

Domhnall O'Dochartaigh: Investigation, writing – original draft, writing – reviewing and editing,

Jeffrey Bakal: Resources, writing – original draft, writing – Reviewing and editing, supervision.

Majid Nabipoor: Methodology, software, validation, formal analysis, writing – original draft, writing – reviewing and editing.

Janice Kung: Methodology, validation, Investigation, writing – original draft, writing – reviewing and editing.

Matthew Douma: Conceptualization, methodology, investigation, writing – original draft, writing- reviewing and editing, supervision.

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Look for supplemental materials such as author interviews and podcasts at www.CJEN.ca

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Supplement 1

Database Search Strategies

Database	Search
MEDLINE Ovid MEDLINE(R) ALL 1946 to June 6, 2021	1. Tourniquets/ 2. tourniquet*.ti,ab,kf. 3. Rhys*.ti,ab,kf. or cuff*.ti. 4. Hemostatic Techniques/is [Instrumentation] 5. Lofquist.ti,ab,kf. 6. Esmarch*.ti,ab,kf. 7. or/1-6 [Tourniquet] 8. exp HEMORRHAGE/pc, th [Prevention & Control, Therapy] 9. h?emorrhag*.ti,ab,kf. 10. ((blood* or bleed* or artery or arterial) adj2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*)).ti,ab,kf. 11. (hemoglobin adj2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*)).ti,ab,kf. 12. Shock, Hemorrhagic/th [Therapy] 13. military.nw. or Journal of Special Operations Medicine.jn. 14. exp Military Personnel/ 15. combat.ti,ab,kf. 16. (soldier* or sailor* or air men or air man or airmen or airman or armed forces or air force or military or naval or (navy not bean*) or coast guard* or submariner* or infantry* or marine corps or marines or army or special forces or warfight* or improvised explosive device* or warefare or land mine* or machine gun* or artillery or schrapnel or battlefield* or grenades or (grenade not (Spain or Carribbean)) or regimental or battalion*).ti,ab,kf. 17. exp Naval Medicine/ 18. exp Military Medicine/ 19. or/8-18 [Hemorrhage control] 20. 7 and 19 21. animals/ 22. humans/ 23. 21 not (21 and 22) 24. (rat or rats or mouse or mice or rodent* or porcine or swine).mp. 25. 23 or 24 [Animal studies] 26. 20 not 25 [Tourniquet Hemorrhage control Not Animal Studies] 27. remove duplicates from 26
Embase Ovid Embase 1974 to 2021 June 6	1. exp tourniquet/ 2. tourniquet*.ti,ab,kw. 3. Rhys*.ti,ab,kw. or cuff*.ti. 4. hemostatic technique/ 5. Lofquist.ti,ab,kw. 6. Esmarch*.ti,ab,kw. 7. or/1-6 [Tourniquet] 8. exp bleeding/pc, th [Prevention, Therapy] 9. h?emorrhag*.ti,ab,kw. 10. ((blood* or bleed* or artery or arterial) adj2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*)).ti,ab,kw. 11. (hemoglobin adj2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*)).ti,ab,kw. 12. hemorrhagic shock/th [Therapy] 13. military.jx. or Journal of Special Operations Medicine.jn. 14. exp soldier/ 15. combat.ti,ab,kw. 16. (soldier* or sailor* or air men or air man or airmen or airman or armed forces or air force or military or naval or (navy not bean*) or coast guard* or submariner* or infantry* or marine corps or marines or army or special forces or warfight* or improvised explosive device* or warefare or land mine* or machine gun* or artillery or schrapnel or battlefield* or grenades or (grenade not (Spain or Carribbean)) or regimental or battalion*).ti,ab,kw. 17. exp military research/ 18. exp military medicine/ 19. or/8-18 [Hemorrhage control] 20. 7 and 19 21. animal/ 22. human/ 23. 21 not (21 and 22) 24. (rat or rats or mouse or mice or rodent* or porcine or swine).mp. 25. 23 or 24 [Animal studies] 26. 20 not 25 [Tourniquet Hemorrhage control Not Animal Studies] 27. remove duplicates from 26

continued…

CINAHL	S1	(MH "Tourniquets")
	S2	TI tourniquet* OR AB tourniquet*
	S3	TI Rhys* OR AB Rhys* OR TI cuff*
	S4	(MH "Hemostatic Techniques+/MT/UT")
	S5	TI Lofquist OR AB Lofquist
	S6	TI Esmarch* OR AB Esmarch*
	S7	S1 OR S2 OR S3 OR S4 OR S5 OR S6
	S8	(MH "Hemorrhage+/PC/TH")
	S9	TI (h#emorrhage or h#emorrhages or h#emorrhagic or h#emorrhaging) OR AB (h#emorrhage or h#emorrhages or h#emorrhagic or h#emorrhaging)
	S10	TI (((blood* or bleed* or artery or arterial) N2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*))) OR AB (((blood* or bleed* or artery or arterial) N2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*)))
	S11	TI ((hemoglobin N2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*))) OR AB ((hemoglobin N2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*)))
	S12	(MH "Shock, Hemorrhagic/TH")
	S13	SO military
	S14	(MH "Military Personnel+")
	S15	TI combat OR AB combat
	S16	TI ((soldier* or sailor* or air men or air man or airmen or airman or armed forces or air force or military or naval or (navy not bean*) or coast guard* or submariner* or infantry* or marine corps or marines or army or special forces or warfight* or improvised explosive device* or warefare or land mine* or machine gun* or artillery or schrapnel or battlefield* or grenades or (grenade not (Spain or Carribbean)) or regimental or battalion*)) OR AB ((soldier* or sailor* or air men or air man or airmen or airman or armed forces or air force or military or naval or (navy not bean*) or coast guard* or submariner* or infantry* or marine corps or marines or army or special forces or warfight* or improvised explosive device* or warefare or land mine* or machine gun* or artillery or schrapnel or battlefield* or grenades or (grenade not (Spain or Carribbean)) or regimental or battalion*))
	S17	(MH "Military Medicine")
	S18	S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17
	S19	(MH "Animals+")
	S20	(MH "Human")
	S21	S19 AND S20
	S22	S19 not S21
	S23	TI (rat or rats or mouse or mice or rodent* or porcine or swine) OR AB (rat or rats or mouse or mice or rodent* or porcine or swine)
	S24	S22 OR S23
	S25	S7 AND S18
	S26	S25 NOT S24
SPORTDiscus	S1	TI tourniquet* OR AB tourniquet*
	S2	TI Rhys* OR AB Rhys* OR TI cuff*
	S3	TI Esmarch* OR AB Esmarch*
	S4	S1 OR S2 OR S3
	S5	DE "HEMORRHAGE"
	S6	TI (h#emorrhage or h#emorrhages or h#emorrhagic or h#emorrhaging) OR AB (h#emorrhage or h#emorrhages or h#emorrhagic or h#emorrhaging)
	S7	TI (((blood* or bleed* or artery or arterial) N2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*))) OR AB (((blood* or bleed* or artery or arterial) N2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*)))
	S8	TI ((hemoglobin N2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*))) OR AB ((hemoglobin N2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*)))
	S9	SO military
	S10	TI combat OR AB combat
	S11	TI ((soldier* or sailor* or air men or air man or airmen or airman or armed forces or air force or military or naval or (navy not bean*) or coast guard* or submariner* or infantry* or marine corps or marines or army or special forces or warfight* or improvised explosive device* or warefare or land mine* or machine gun* or artillery or schrapnel or battlefield* or grenades or (grenade not (Spain or Carribbean)) or regimental or battalion*)) OR AB ((soldier* or sailor* or air men or air man or airmen or airman or armed forces or air force or military or naval or (navy not bean*) or coast guard* or submariner* or infantry* or marine corps or marines or army or special forces or warfight* or improvised explosive device* or warefare or land mine* or machine gun* or artillery or schrapnel or battlefield* or grenades or (grenade not (Spain or Carribbean)) or regimental or battalion*))
	S12	S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11
	S13	S4 AND S12

continued…

Cochrane Library	#1	MeSH descriptor: [Tourniquets] explode all trees
	#2	tourniquet*:ti,ab,kw
	#3	Rhys*:ti,ab,kw
Via Wiley	#4	cuff*:ti
	#5	[mh "Hemostatic Techniques"/is]
	#6	Lofquist:ti,ab,kw
	#7	Esmarch*:ti,ab,kw
	#8	#1 or #2 or #3 or #4 or #5 or #6 or #7
	#9	[mh hemorrhage/pc,th]
	#10	h*emorrhag*:ti,ab,kw
	#11	((blood* or bleed* or artery or arterial) near/2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*)):ti,ab,kw
	#12	(hemoglobin near/2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*)):ti,ab,kw
	#13	[mh "Shock, Hemorrhagic"/th]
	#14	MeSH descriptor: [Military Personnel] explode all trees
	#15	combat:ti,ab,kw
	#16	(soldier* or sailor* or air men or air man or airmen or airman or armed forces or air force or military or naval or (navy not bean*) or coast guard* or submariner* or infantry* or marine corps or marines or army or special forces or warfight* or improvised explosive device* or warefare or land mine* or machine gun* or artillery or schrapnel or battlefield* or grenades or (grenade not (Spain or Carribbean)) or regimental or battalion*):ti,ab,kw
	#17	MeSH descriptor: [Naval Medicine] explode all trees
	#18	MeSH descriptor: [Military Medicine] explode all trees
	#19	#9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18
	#20	#8 and #19
	#21	MeSH descriptor: [Animals] explode all trees
	#22	MeSH descriptor: [Humans] explode all trees
	#23	#21 not (#21 and #22)
	#24	rat or rats or mouse or mice or rodent* or porcine or swine
	#25	#23 or #24
	#26	#20 not #25

ProQuest Dissertations & Theses Global	S1	ti(tourniquet*) OR ab(tourniquet*)
	S2	ti(Rhys*) OR ab(Rhys*) OR ti(cuff*)
	S3	ti(Esmarch*) OR ab(Esmarch*)
	S4	1 or 2 or 3
	S5	ti(h?emorrhag*) OR ab(h?emorrhag*)
	S6	ti(((blood* or bleed* or artery or arterial) near/2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*))) OR ab(((blood* or bleed* or artery or arterial) near/2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*)))
	S7	ti((hemoglobin near/2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*))) OR ab((hemoglobin near/2 (loss* or lose* or losing or flow* or stop* or occlud* or occlusion* or control*)))
	S8	ti(combat) OR ab(combat)
	S9	ti((soldier* or sailor* or air men or air man or airmen or airman or armed forces or air force or military or naval or (navy not bean*) or coast guard* or submariner* or infantry* or marine corps or marines or army or special forces or warfight* or improvised explosive device* or warefare or land mine* or machine gun* or artillery or schrapnel or battlefield* or grenades or (grenade not (Spain or Carribbean)) or regimental or battalion*)) OR ab((soldier* or sailor* or air men or air man or airmen or airman or armed forces or air force or military or naval or (navy not bean*) or coast guard* or submariner* or infantry* or marine corps or marines or army or special forces or warfight* or improvised explosive device* or warefare or land mine* or machine gun* or artillery or schrapnel or battlefield* or grenades or (grenade not (Spain or Carribbean)) or regimental or battalion*))
	S10	5 or 6 or 7 or 8 or 9
	S11	4 and 10

Supplement 2

Statistical analysis notes

1- Body Mass Index (BMI) is reported in some papers instead of weight and height. We calculated BMI for reported weights and heights, BMI = weight (kg) / height^2 (m). Let X = weight and Y = height, $= \frac{X}{Y^2}$, and suppose $Y \sim N(\mu_Y, \sigma_Y^2)$, then $Y^2 \sim \sigma_Y^2 \chi^2\left(\frac{\mu_Y^2}{\sigma_Y^2}\right)$, then $\mu_{Y^2} = \mu_Y^2 + \sigma_Y^2$ and $\sigma_{Y^2}^2 = 2\sigma_Y^4 + 4\mu_Y^2\sigma_Y^2$, therefore an approximate variance by delta method is $var\left(\frac{X}{Y^2}\right) = \left(\frac{\mu_X}{\mu_{Y^2}}\right)^2\left(\frac{\sigma_X^2}{\mu_X^2} + \frac{\sigma_{Y^2}^2}{\mu_{Y^2}^2} - 2\frac{\sigma_X\sigma_{Y^2}\rho_{XY^2}}{\mu_X\mu_{Y^2}}\right)$ Approximation for var(X/Y) : http://www.stat.rice.edu/~dobelman/notes_papers/math/TaylorAppDeltaMethod.pdf.
approximation for X^2: http://personalpages.to.infn.it/~zaninett/pdf/statistical-distributions.pdf
We considered$\rho_{XY} = 0.32$.

2- Blood pressure is reported by SBP and DBP, however in some papers it is reported by MAP only, $MAP = \frac{1}{3} BBP + \frac{2}{3} SBP$. We used $\rho_{SBP,DBP} = 0.74$ to calculate related variance.
Correlation: https://pubmed.ncbi.nlm.nih.gov/18192832/

3- We combined groups like female and male, right or left arm or leg. For this combinations we used the following formulations from Cochrane hand book: "Cochrane Handbook for Systematic Reviews of Interventions"

	Group 1	Group 2	Combined groups
Size	N_1	N_2	N_1+N_2
Mean	M_1	M_2	$\frac{N_1M_1+N_2M_2}{N_1+N_2}$
SD	SD_1	SD_2	$\sqrt{\frac{(N_1-1)SD_1^2+(N_2-1)SD_2^2+\frac{N_1N_2}{N_1+N_2}\left(M_1^2+M_2^2-2M_1M_2\right)}{N_1+N_2-1}}$

4- Converting mean median IQR and Range to mean Median: Estimating the sample mean and standard deviation from commonly reported quantiles in meta-analysis, Statistical Methods in Medical Research, vol. 29, 9: pp. 2520-2537., First Published January 30, 2020.

5- In NPS for none-2, little-5, moderate-7, severe-10: we generated a vector of (0,0,1,1,1,1,1,2,2,2,2,2,2,3), then make average multiply by 10/3 to convert it to 0-10 scale. For SD again multiplied by 10/3. note that Var(aX)=a^{2}Var(X).

Supplement 3

Extended minimum data set

First author, year	Measure of advantage	Skin pressure measurement	Limb segment device was applied to	Clothing under tourniquet	Was application guided (Yes/No)	Pulse assessment location
Beaven et al., 2017	"Cuff pumps", Windlass turns	-	Upper Leg	None	Y	Popliteal
Beaven et al., 2018	-	-	Upper Leg	None	Y	Popliteal
Beaven et al., 2021	-	-	Upper Leg	Uniform and CBRN suit	Y	Popliteal
Calkins et al., 2000	-	-	Not specified	Not specified	N	Radial, dorsal pedal
Childers et al., 2011	Windlass turns	-	Upper Leg	Uniform	Y	Dorsal pedal
Guo et al., 2011	-	-	Upper arm*, upper leg*	-	N	Brachial, popliteal
Heldenberg et al., 2015	-	-	Upper arm, upper leg	-	N	Radial, Ulnar, dorsal pedal, posterior tibial
Higgs et al., 2016	-	-	Upper arm	Uniform	N	Radial
Jaffer, 2012 (Jaffer et al., 2012)	-	-	Upper arm, upper leg	Skin	Y	Femoral
King, 2006 (King et al., 2006)	-	-	Upper Leg	uniform, Winter clothes	N	Dorsal pedal, posterior tibial
Kragh, 2019(Kragh et al., 2019)	-	-	Upper leg	-	N	Not assessed
Martinez, 2018 (Martinez et al., 2018)	-	-	Upper leg*	-	N	Popliteal
Peponis, 2016 (Peponis et al., 2016)	Inflation pressure, windlass turns (180)	-	Upper leg	Uniform, CBRN suit	Y	Dorsalis pedis, posterior tibial
Sanak, 2018 (Sanak, 2017)	-	-	Upper arm	Uniform	N	Radial
Savage, 2013 (Savage et al., 2013)	-	-	Upper arm, upper leg	Uniform, winter clothes	N	Not specified
Schreckengaust, 2014 (Schreckengaust et al., 2014)	-	-	Upper leg	Uniform	N	Dorsal pedal
Slaven, 2015 (Slaven et al., 2015)	Windlass turns, length of mechanical device remaining	mmHg	Upper leg	Skin	Y	Dorsal pedal
Swan, 2009 (Swan et al., 2009)	Inflation pressure	-	Upper arm, lower arm, upper leg, lower leg	-	Y	Radial, posterior tibial

continued…

First author, year	Measure of advantage	Skin pressure measurement	Limb segment device was applied to	Clothing under tourniquet	Was application guided (Yes/No)	Pulse assessment location
Taylor, 2011 (Taylor et al., 2011)	-	-	Upper leg	-	Y	Popliteal
Unlu, 2015 (Unlu et al., 2015)	Windlass degrees	-	Upper arm, upper leg	-	N	Radial, ulnar, popliteal
Vuillemin, 2017 (Vuillemin et al., 2018)	-	-	Upper leg	Uniform	N	Popliteal
Wall, 2017a (Wall, Buising, Grulke, et al., 2017)	-	mmHg	Upper arm, upper leg,	-	Y	Radial, posterior tibial
Wall, 2017b (Wall, Buising, Nelms, et al., 2017)	Tooth advances	mmHg	Upper leg	Skin	Y	Dorsal pedal, posterior tibial
Wall, 2013(Wall et al., 2013)	Inflation pressure, number of turns, number of wraps	mmHg	Upper arm, upper leg	Skin	Y	Radial, posterior tibial
Wall, 2014 (Wall et al., 2014)	Windlass turns, ladder length	mmHg	Upper arm, upper leg	Skin	Y	Radial, posterior tibial, dorsal pedal
Wall, 2015 (Wall et al., 2015)	Windlass turns, ladder length, wraps	mmHg	Lower arm, lower leg	skin	Y	Not specified
Wall, 2016 (Wall et al., 2016)	Tooth advances	mmHg	Upper arm, upper leg	Skin	Y	Not specified
Wall, 2019 (Wall et al., 2019)	-	mmHg		Upper leg	-	Y
Wall, 2020 (Wall et al., 2020)	Windlass turns, Tooth advances, wraps	mmHg	Upper leg	Clothing, skin, uniform	Y	Pedal
Wall, 2012a (Wall, Welander, Sahr, et al., 2012)	Visual inspection	-	Upper arm, lower arm, upper leg, lower leg	Skin	N	Radial, posterior tibial
Wall, 2012b (Wall, Welander, Singh, et al., 2012)	Visual assessment	-	Upper arm, lower arm, upper leg, lower leg	Skin	Y	Radial, posterior tibial
Walters, 2005 (Walters et al., 2005)	-	-	Upper arm, upper leg	Skin	Y	Radial, popliteal
Wenke, 2005 (Wenke et al., 2005)	-	-	Upper arm, upper leg	Clothing	N	Radial, popliteal, dorsal pedal
Weppner, 2013 (Weppner et al., 2013)	Number of turns	-	Upper leg	-	Y	Dorsal pedal
Unlu, 2017 (Unlu et al., 2017)	Number of turns	-	Upper leg	Uniform	Y	Popliteal

Supplement 4

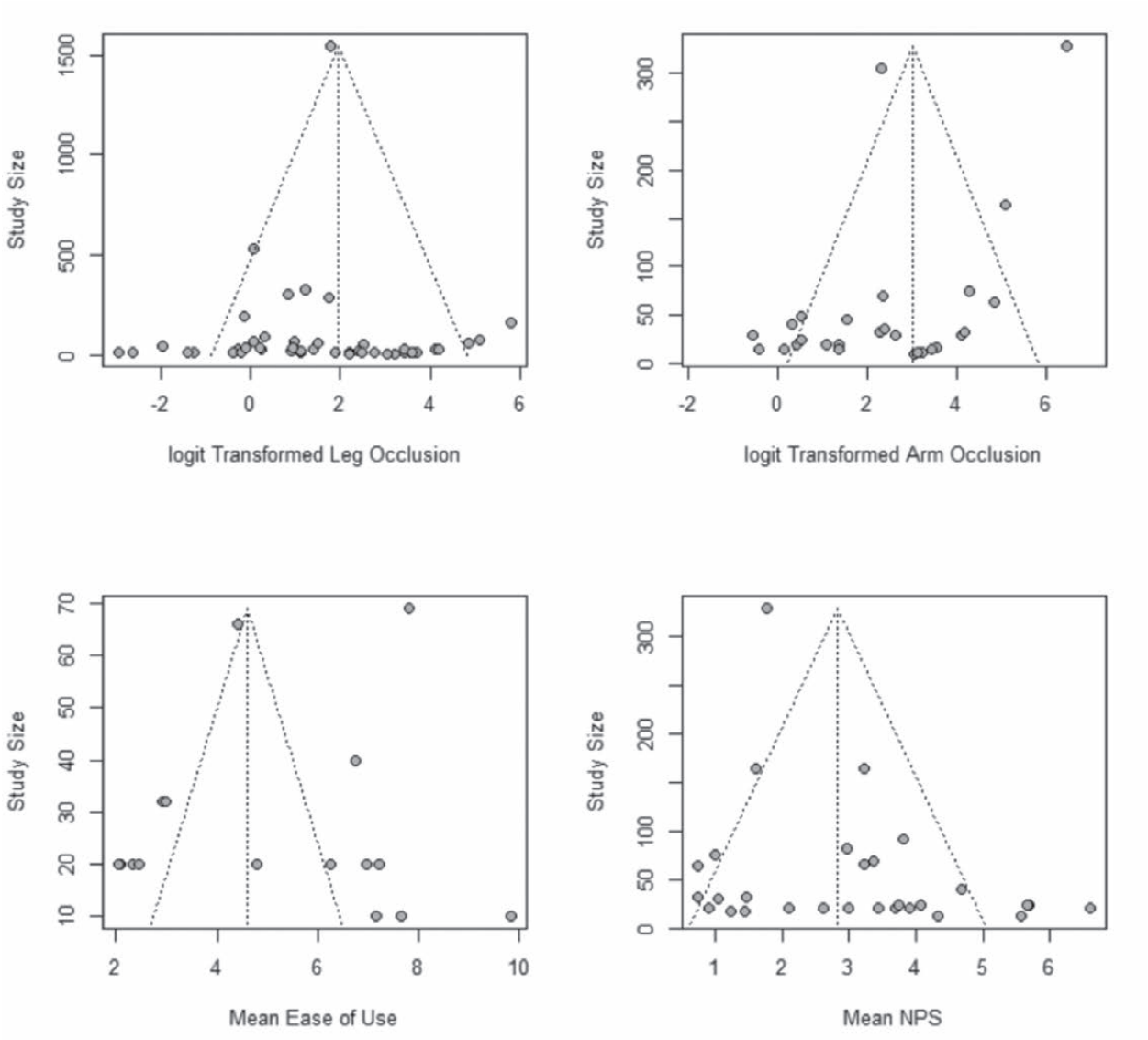
Sub group analysis of tourniquets by mechanical advantage mechanism

	n	Proportion [95% CI]	I^2	Subgroup difference p-value
Mid-thigh=1				
Elastic	6	0.64[0.29; 0.89]	90%	
Friction	3	0.18[0.02; 0.69]	85%	
Mechanical	12	0.95[0.76; 0.99]	94%	
Pneumatic	9	0.99[0.84; 0.99]	88%	
Windlass	27	0.83[0.68; 0.91]	99%	
Mid-thigh=1				
Elastic	3	0.72[0.24; 0.95]	88%	
Friction	3	0.73[0.25; 0.95]	87%	
Mechanical	4	0.98[0.87; 0.99]	61%	
Pneumatic	4	0.99[0.31; 1.00]	85%	
Windlass	9	0.93[0.80; 0.98]	85%	
Mid-thigh=0				
Mechanical	2	0.99[0.94; 0.99]	0%	
Pneumatic	2	0.99[0.96; 0.99]	0%	
Windlass	6	0.88[0.54; 0.98]	96%	
Mid-thigh=1				
Elastic	2	4.36[0.62; 8.11]	96%	
Friction	2	4.41[0; 9.00]	99%	
Mechanical	2	2.66[1.89; 3.44]	66%	
Pneumatic	2	4.79[0.04; 9.55]	98%	
Windlass	4	6.07[4.09; 8.05]	98%	
Mid-thigh=0				
Mechanical	1	2.99[2.94; 3.03]	-	
Mid-thigh=1				
Elastic	2	5.17[2.33; 8.01]	84%	
Friction	2	3.35[0.83; 5.87]	89%	
Mechanical	6	2.01[1.40; 2.61]	95%	
Pneumatic	5	2.29[1.16; 3.43]	92%	
Windlass	9	3.44[2.87; 4.00]	94%	
Mid-thigh=0				
Mechanical	2	0.89[0.64; 1.14]	73%	
Pneumatic	1	1.62[1.38; 1.85]	-	
Windlass	2	2.90[0.64; 5.16]	98%	

Abbreviations: "Mid-Thigh=0"-non-mid-thigh application; "Mid-Thigh=1"-Mid-thigh application

Supplement 5

Funnel plot of meta-analyzed studies



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Occupational disappointment and emergency nurses: A qualitative descriptive study

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Abstract

Background: Occupational disappointment is a novel concept in emergency nursing. It is a feeling of disheartenment with career choice. It results from prevalent, unaddressed verbal abuse in the emergency department directed towards nurses from patients and/or their visitors. Occupational disappointment is conceptually different from burnout and compassion fatigue. In the context of the COVID-19 pandemic, it is important to acknowledge this phenomenon and understand its implications while considering strategies to mitigate it.

Methods: A qualitative descriptive methodology was used in this study. Nurses were interviewed to explore the question: How do emergency department nurses experience occupational disappointment as a result of verbal abuse?

Findings: Three major themes were identified: (1) nurses' experiences of occupational disappointment; (2) nurses' responses to occupational disappointment; (3) nurses' concerns regarding occupational disappointment. While organizational policies for addressing verbal abuse exist, the development of a procedure attached to the policy would help guide nurses when managing this violence. Failure of nurse leaders to implement such measures contributes to nurses' occupational disappointment, consequently affecting nurses' practice, mental health, and retention. While these implications are not new, the COVID-19 pandemic has exacerbated this phenomenon. The magnitude of verbal abuse that emergency nurses currently face has increased exponentially; a renewed urgency for strategic action is necessary.

Conclusion: Occupational disappointment is a direct result of verbal abuse and an indirect result of organizational failures to support nurses and empower them to mitigate this abuse.

Keywords: emergency department, emergency nurses, occupational disappointment, verbal abuse, verbal violence

Verbal abuse is frequently experienced by healthcare workers. Nurses working in the emergency department (ED) are particularly susceptible to this type of abuse (Al-Shamlan et al., 2017; Partridge & Affleck, 2017). ED nurses are subjected to verbal abuse because they provide care for patients who are stressed or aggressive, as well as those under the influence of drugs and/or alcohol (Al-Shamlan et al., 2017; Banda et al., 2016; Copeland & Henry, 2017; Partridge & Affleck, 2017; Pich et al., 2017; Zhang et al., 2017). Some ED nurses regard verbal abuse as part of the job (Hogarth et al., 2016; Hyland et al., 2016). Verbal abuse is such a part of ED nurses' everyday work, and it occurs with such frequency that nurses do not consider it to be violence at all (Baig et al., 2018). This acceptance of verbal abuse may seem like it is an expectation of nurses' work rather than an anomaly; this may be an important reason why verbal abuse continues to be prevalent in the ED.

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Further, the negative effects of verbal abuse include nurses losing their concentration at work, as well as nurses experiencing mental exhaustion; these effects have an impact on patient care (Hassankhani et al., 2017; Yoon & Sok, 2016). There are also organizational impacts related to verbal violence directed toward nurses such as increases in sick leave, resignations, and recruitment difficulties (Howerton Child & Sussman, 2017; Li et al., 2017).

Finally, nurses enter the profession to help people and then are faced with verbal abuse, which is disheartening and can ultimately result in occupational disappointment (OD) (Howerton Child & Sussman, 2017, p. 547). Importantly, OD is distinguished from burnout and compassion fatigue. Burnout is a chronic response to repeated stressful exposures. Compassion fatigue is abrupt and a result of being exposed to someone else's trauma. OD is unique because it is not considered to be traumatic in nature, yet the negative stimulus is identifiable, directed to, and felt by the ED nurse (Howerton Child & Sussman, 2017). The phenomenon of OD results in a feeling of dissatisfaction in career choice as a result of endemic verbal abuse that is left unaddressed (Hassankhani et al., 2017; Howerton Child & Sussman, 2017).

The potential for the COVID-19 pandemic to exacerbate OD is concerning. Abuse of nurses and healthcare workers has increased during the COVID-19 pandemic (Alsuliman et al., 2021; Bitencourt et al., 2021; Devi, 2020; Yang et al., 2021). Additionally, nurses are working under extraordinarily challenging conditions. Navigation of the health system by patients and their families has become both changeable and challenging. During COVID-19, at times, healthcare resources have been scarce and there has been controversy regarding fair distribution of these resources. Inevitably, such controversial and high-stress situations have led to abuse of healthcare workers in both the workplace and in public spaces in their communities (Alsuliman et al., 2021; Bitencourt et al., 2021; Dye et al., 2020; Larkin 2021; Yang et al., 2021).

Method

Research design and question

Qualitative descriptive (QD) methodology in nursing research explores phenomena such as people's concerns and responses to events (Bradshaw et al, 2017; Kim et al., 2017). With this as context, QD methodology was employed to answer the research question: How do ED nurses experience OD as a result of verbal abuse? This topic was of particular interest to the first author, a female RN employed in an ED who had experienced verbal abuse from patients and their families. The first author became increasingly aware of incidents of abuse towards staff both in person and via online platforms. Over time, a change in staff sentiment towards the ED and the patients they served was also noted by the first author. This study followed the Adherence to Consolidated Criteria for Reporting Qualitative Studies (COREQ) guidelines (Tong et al., 2007).

Sample

Purposive sampling was used to recruit six female nurses aged 24 to 43 years with 2 to 18 years of experience. Purposive sampling allows for recruitment of participants who possess the experience required for the study (Bradshaw et al., 2017); this type of sampling is strategically purposeful in obtaining information-rich data to reveal insight (Patton, 2015). In QD research studies, sample sizes are relatively small; the research is focused on in-depth contact with participants (Bradshaw et al., 2017). The six participants in this study represented a range of ages and years of nursing experience; nurses worked in two of four ED sites. An adequate sample size is one that sufficiently answers the question while obtaining data rich in information (Bradshaw et al., 2017; Sandelowski, 2000). With this as context, the researcher determined the sample size to be adequate for this QD study.

The following are the inclusion criteria for the nurses participating in this study: currently or previously employed at one of four EDs within a larger hospital corporation in an urban centre in eastern Canada; have experienced verbal abuse from patients/visitors; self-identify as having experienced OD and able to provide contextual insight into the experience of OD.

Research Ethics Board (REB) approval (File no. 23900) was obtained from the post-secondary institution in which the first author was enrolled at the time of the study. Additionally, REB approval (RID# 2020-005) was obtained from the hospital corporation in which the four EDs were located from which participants were recruited. Recruitment emails were sent to nurses employed at the four ED sites. The researcher explained the study to potential participants who responded to the recruitment email. Informed consent was obtained from all participants. All participants who consented to the study completed the interviews; there was no attrition.

Data collection and analysis

Data were collected using in-depth, semi-structured interviews of up to 40 minutes. The primary source of data collection in QD research is semi-structured, in-depth interviews (Bradshaw et al., 2017; Sandelowski, 2000). These interviews were conducted exclusively by the first author with the guidance of the second author. The interview guide was developed by the first author with direction and oversight from the second author. Interview questions were informed by a review of relevant literature and qualitative interviewing scholarship (Kvale & Brinkman, 2009). At the beginning of each interview, trust between researcher and participant was forged through kinship ties; the first author described her role as an ED registered nurse with a decade of experience, her interest in OD and goals of uncovering the meaning of OD in ED nursing culture. Throughout the research process, the first author kept a reflexive journal and engaged in periodic debriefings with the second author. Participants were interviewed via the telephone. Interviews were conducted in September and October 2020. Following informed consent, interviews were digitally recorded. See Table 1 for interview questions.

Digital audio recordings were transcribed verbatim. Transcripts were anonymized and imported into NVivo (released in March 2020). Field notes were written following all interviews. Interview data were analyzed using qualitative content analysis, a strategy frequently employed in QD methodology researchers (Vaismoradi & Snelgrove, 2019). Qualitative content

Table 1

Interview Questions

1. What is your interpretation or understanding of the term occupational disappointment?
2. Tell me about a time when you experienced verbal abuse from a patient and/or their visitor that led to a feeling of occupational disappointment.
3. What were the actions you took, or didn't take, in response to a patient's verbal abuse directed towards you?
4. How did the feeling of occupational disappointment change or alter your nursing practice?
5. Do you think that occupational disappointment amongst emergency nursing staff is addressed by those in leadership?
6. What are some suggestions you think would be effective in managing emergency nurses' experiences of occupational disappointment?

analysis is an inductive approach with the purpose of deriving concepts, themes, or a model through interpretation from raw data (Vaismoradi & Snelgrove, 2019). In following this process, the first author reduced the data to coded units. The process of constant comparison helped to identify events, compare them to emerging themes, and highlight main ideas as codes related to the phenomenon (Vaismoradi & Snelgrove, 2019). Emerging sub-themes in the data included organizational supports, nurses' mental health, nursing practice, and feeling powerless. Codes were identified and categorized independently by the first author into the prominent themes of nurses' experiences, concerns, and responses to OD. Once themes and sub-themes were developed, each transcript was then reanalyzed using an iterative process of reading, reviewing, and refining.

Results

Three major themes were derived from the data related to ED nurses and the phenomenon of OD: 1) nurses' experiences of OD (with subthemes of powerlessness and normalizing); 2) nurses' responses to OD (with changes in nursing practice, retention, and nurses' mental health as subthemes); 3) and nurses' concerns regarding OD (ineffective leadership was a subtheme).

Nurses' experiences of OD

Powerlessness

In response to verbal abuse in the ED, nurses often felt powerless. They stated that departmental policy related to verbal abuse was rarely enforced resulting in a feeling of powerlessness: "*We have this code of conduct… a whole nice paper on the wall posted all over the place about patient conduct… except theirs is tolerated and ours isn't… it will always come down to we* [the nurses] *should have done something differently.*" The threat of being labelled a "bad nurse" online on social media also loomed over nurses, contributing to feelings of powerlessness: "*I haven't seen that nurse back since she* [the patient] *did that. She pushed a great, experienced nurse out of our emergency department because of a bunch of comments she wrote* [on Facebook]." For that nurse, OD persisted online on a Facebook post retelling a one-sided account of a patient-nurse exchange well after the occurrence: "*Now there's a storyline in the world that's fake and your face is attached… you don't get the opportunity to defend yourself… the deck is stacked against you in terms of your ability to say, 'That's not actually what happened.'*" The threat of being anonymously verbally abused online was spoken about in detail by nurses interviewed signaling the impact and importance comments on social media could have on nurses' experiences of OD.

Normalizing

The act of normalizing verbal abuse by ED nurses was reflected in a lack of consequences for patients' abusive behavior: "*I find the consequences to their behavior are very minimal so then it becomes normalized because… they do it all the time and there's no consequence for their actions… you do get used to it. It is very normalized.*" Nurses questioned how they were expected to manage this abuse when there was no overt discussion about it. Consequently, nurses proceeded with their work, not dealing with the issue: "*What happens when a patient yells at you? How do you get over this? How do you not let this affect your care? How do you approach the patient? …Those discussions are… not happening at all.*"

Nurses' responses to OD

There are clear responses related to the profound influence of OD in terms of nursing practice, retention of nurses in the health system, and nurses' mental health.

Nursing practice

Nurses indicated that OD influenced their practice subsequently, impacting patient care. For example, in the waiting room a nurse described her thinking process before she cares for a rude patient: "*You see the patient's chart and you think he's so rude, he can probably wait, but you try not to, but it's very hard when someone is personally attacking you and then you have to go care for them.*" The nurse considered levelling a punitive measure towards the patient displaying abusive behavior. This is a common reactive strategy.

Instinctual behavior was also spoken of as a way to manage emotions in response to verbal abuse while remaining able to continue to work: "*I'm like flatter than flat, I will not have the same response… I say* [to myself]*, 'Why do you do this?' However, I just can't help it. I can't help but just be very flat. It's terrible.*"

One nurse noted that her practice changed when treating difficult patients:

"[You've] *already red-flagged that person in your mind… I don't think you'd spend idle time, maybe chitchatting with patients like this to find out more information… why would you want to spend time with somebody who's just cussed you out?*" "Idle time" is the few moments during a shift when nurses are not inundated with immediate tasks; it is often the only time for health teaching and uncovering subtle aspects of patients' health histories. Feeling exhausted by a patient's abuse thwarts nurses' ability to uncover important information and can deleteriously affect holistic patient care.

Retention

The impact of OD on the well-being of nurses and its subsequent impact on remaining in the profession is evident: *"I don't work full-time in emergency, to me it's not worth it … I'd rather make no money the next day than be yelled at and be treated inappropriately and… nothing is ever done about it."* Furthermore, the impact on new graduates in the context of the sustainability of a lengthy career as an ED nurse was substantiated: *"I am a new nurse…When I graduated nursing school, I knew I wanted to be an emerg*[ency] *nurse… I'm struggling with that right now … I'm two years into a profession that I need to do for 30 years…Now every time I have to get in my car and go to work, every second I'm googling other things I can do with my life."*

It is not surprising that because of ongoing abuse, nurses are exhausted, disheartened and leave the profession feeling unfulfilled, unrecognized, and not appreciated by patients and hospital administrators, as indicated by this nurse: *I left in less than two years because I was consistently let down…. As a nurse, you cannot get a restraining order on a patient… They can fully assault you and you're the one who has to get a new job if you're uncomfortable, because you can't deny access to somebody into an emergency department, so… you will never get a restraining order, you're the one who has to get a new job."*

Nurses' mental health

It is not surprising that a significant consequence of OD was the profound impact on nurses' mental health. The nurses compared how difficult cases or events in the ED were noted, addressed, and debriefed with recommendations for change, yet the verbal abuse and persistent feeling of OD was always left unaddressed. Referring to episodes of patient aggression, one nurse stated, "*I do find that I get anxious. I'm anxious for a period of time after that. It makes me very uncomfortable."*

An experienced nurse described that the mental health of ED nurses became important to leaders only when it became fiscally significant: *"I don't think there's ever conversation* [about OD]. *If you're off on mental health* [leave]*… then they're concerned about you, but not concerned about the people who are just coping… if it's affecting the budget then maybe it will be looked at."* Notably, the stressors of OD infiltrated the personal lives of nurses long after their shifts ended: "*They* [recollections of verbal abuse] *come up in your dreams, or you're out with your friend… explaining a situation and they look at you like you're on a different planet. They are like, 'That doesn't happen to me at work.'"*

Nurses' concerns regarding OD

Ineffective nursing and organizational leadership

Nurses linked their experiences of OD to ineffective nursing and organizational leadership. Nurses, as frontline staff, reported they could not mitigate the precipitants of verbal abuse such as staffing shortages and overcrowding. These issues needed to be managed by leaders such as the nurse managers in the ED and in the hospital. Nurses agreed their experiences of OD were ineffectively addressed by their leadership. *"Our occupational disappointment is influenced by many things… I know patient flow in our department is a… huge factor in verbal abuse… On the front line, we cannot control that… please don't take it out on us."*

Leadership often failed to acknowledge incidents of verbal abuse or offer strategies to address these incidents. This inattention was concerning to nurses: "*I think, one, the corporation doesn't support us but, two, they actively undermine the situation."* The hesitation to offend the public was viewed to be a root cause for the lack of overt denunciation of verbal abuse towards nurses: *"I feel they're too afraid to step on the public's toes, as opposed to protecting their worker"* and *"I've seen many times where we've been verbally assaulted by a patient, and you go get management and they're shaking hands and walking them* [the patient/visitor] *out the front door. To me you're just saying, 'It's okay to do what you want to do here' instead of saying 'this is zero tolerance… you have to leave.'"* At the level of management in the ED, the fear of backlash over addressing verbal abuse aimed at nurses extends to the virtual world: *"I think there's a lot of fear with the whole Facebook thing… a lot of management's reactions* [are] *based out of fear… instead of the whole corporation… saying, 'This is our mission, if patients are unsatisfied, then they're unsatisfied, but we're not going to let our nurses get hurt or endure any more of this behaviour.' I don't know if it's the corporation or if it's out of fear… of losing* [their] *jobs, being named and that…"*

Lack of training to effectively respond to verbal abuse and potentially mitigate OD was articulated: *"I don't think you receive any kind of training, so when, not if, when, you're verbally attacked in this department, this is how you can and should respond."* Lack of clear strategies for nurses to employ when verbal abuse occurs was reiterated: *"We don't really have a clear, concise role written out as to what the steps are if a patient acts like this, because some people will just stand there… and some of us get upset."* All nurses interviewed indicated that leaders needed to acknowledge that OD exists, and strategies are required to mitigate OD at its onset, that is, when verbal abuse is leveled at a nurse in the ED.

Discussion

Occupational disappointment is a relatively new phenomenon. It can be experienced by ED nurses as a result of verbal abuse from patients and/or their visitors (Howerton Child & Sussman, 2017). Occupational disappointment is delineated from compassion fatigue which is abrupt and results from another person's trauma and burnout, which is chromic, and resulting from repeated stressors (Howerton Child & Sussman, 2017). In this study, nurses reported experiencing OD because of persistent, unaddressed verbal abuse on the job and, to a degree, online. Nurses expressed feelings of powerlessness and they normalized the abuse as part of the context of working with patients and families in an ED. To minimize the effect of OD, nurses altered their practice by providing a minimum standard of care or, ultimately, they left the ED in search of alternate employment. Occupational disappointment takes a toll on nurses' mental health. In this study, OD manifested in nurses feeling stressed and anxious while working, however these feelings persisted when nurses went home. Nurses felt unsupported by nursing and organizational leaders. While references were made to "zero tolerance" hospital policies, the inability to operationalize these policies was evident. Interestingly, Howerton Child and Sussman (2017) reported that managerial involvement and support were

neutral factors related to OD. However, a suggestion that managers should engage with staff to make known what support they are able to offer (Howerton Child & Sussman, 2017, p. 550).

There has been an increase in violence against nurses and healthcare workers since the beginning of the COVID-19 pandemic (Alsuliman et al., 2021; Bitencourt et al., 2021; Devi, 2020; Larkin, 2021; Yang et al., 2021). This increase in violence underscores the urgency of the implications of this study. The following are several implications for leaders in nursing and health care organizations related to mitigation of OD in ED nurses. Organizations must encourage and support nurses to report verbal abuse (Al-Shamlan et al., 2017; Hassankhani et al., 2017; Hogarth et al., 2017; Lenaghan et al., 2018; World Health Organization, WHO, 2021). When abuse is reported, it is being formally acknowledged. While previous research indicates a need for policy (Hassankhani et al., 2017; Hogarth et al., 2017; WHO, 2021; Yang et al., 2021), the findings from this study align with this research and could be applied to a local context. A specific step-by-step procedure would provide nurses with an algorithm to follow in the event of verbal abuse from patients or visitors. Including frontline nurses in the development of this policy and procedure could alleviate nurses' feelings of powerlessness and normalization of abuse as an expectation of working in the ED. This would signal that verbal abuse is not acceptable and mitigate a major precipitant of OD. The importance of tending to and supporting nurses' mental health cannot be understated (Havaei, 2021; Liu et al., 2020; WHO 2021). The Canadian Federation of Nurses Unions (2017) acknowledged that violence in healthcare settings has a profound impact on nurses' mental health. The deliberate and consistent implementation of policy and procedure could make strides toward lessening the effects of verbal abuse and OD on nurses' mental health.

Retention of nurses in the profession is a global issue (Efendi et al., 2019; Marufu et al., 2021). From an economic and pragmatic standpoint, challenges with retention of nurses leads to increased costs and creates staffing problems due to recruitment and deployment of unskilled nurses compromising quality of care (Ashton et al., 2018; Howerton Child & Sussman, 2017; Yoon & Sok, 2016). Enacting clear and direct policies and procedures related to intolerance of abuse, is an opportunity for nurse leaders to demonstrate continued investment in their skilled nursing staff in the ED.

Nurses in the ED require greater support from the organization and leadership, as well as advanced training related to recognizing and responding to violence and harassment (Al-Qadi, 2020; Aljohani et al., 2021; Ashton et al., 2018; WHO, 2021). International recommendations for addressing workplace violence including briefings related to potential security issues, as well as debriefings following incidents of violence (WHO, 2021). These recommendations align with the responses of the nurses in this study, as they advocated for debriefing following incidents of abuse in the ED, as well as additional training in recognizing and effectively responding to verbal abuse. The nurses in this study recognized that they wanted the skills to deal with their feelings of OD after encounters with difficult patients; a peer support group could serve as a supportive environment to process feelings. Studies indicate nurses would benefit from additional educational opportunities related to both preventing and managing abuse in the ED (Aljohani et al., 2021; Ashton et al., 2018; Hassankhani et al., 2017; Yoon & Sok, 2016). While nurses are required to refresh their skills on cardiac life-saving events, it is compelling to consider supporting nurses to periodically renew their skills and knowledge related to managing violence and harassment. Howerton Child and Sussman (2017) asserted that that violence prevention education should be tailored to the time-pressed, acute environment of the ED.

There is a substantive body of literature detailing abuse of nurses and healthcare workers in the ED (Aljohani et al., 2021; Ashton et al., 2018). However, the description of the phenomenon of OD is novel. The acknowledgment of verbal abuse, as a precipitant of OD is significant. Further, the subsequent impact on nurse retention, nurses' mental health and overall well-being as a result of OD is notable. Studies during the COVID-19 pandemic have demonstrated that verbal abuse is widely experienced by nurses and healthcare workers (Bitencourt et al., 2021; Yang et al., 2021). The pandemic has added urgency to the need for collective thinking followed by deliberate strategic action based on this research study and the many studies preceding it.

Limitations

It is important to acknowledge several limitations in this study. First, the sample for this study is specific to two EDs within the health region in which the nurses were currently or formerly employed. Findings in this study may not be generalizable to situations other than those in close contextual similarity. Second, with respect to the COVID-19 pandemic, interviews that would have been traditionally held in a face-to-face setting instead were conducted on the telephone. Though virtual conferencing was offered, all participants chose to be interviewed over the telephone. This presented a potential limitation, as the researcher-participant engagement manifested in nuances of body language or facial expression in discussion of a sensitive topic such as OD were unable to be seen and noted as part of the context of the data collection.

Conclusion

The exploration of OD as a phenomenon experienced first-hand by emergency nurses because of verbal abuse is essential given the profound toll it takes on both nurses and patients. Considering the COVID-19 pandemic has magnified stressors in an already strained system, nurses experience verbal abuse on the job while paradoxically being hailed as frontline heroes. The concerns and life experiences of the nurses in this study suggest that OD occurs due to verbal abuse, but also indirectly because of organizational shortcomings. This reflects a rally cry that is evident as nurses' voices amplify and challenge what should not be tolerated as part of their job. This study suggests that OD results in the deleterious effects on nurses' retention, mental health, and practice. Future research should explore OD with the aim of a deeper understanding of its root causes and potential solutions, however the acknowledgement of it as a unique phenomenon remains an important first step.

Implications for Emergency Clinical Practice

- Emergency nurses must be aware of current institutional policies addressing verbal abuse in the workplace.
- Engaging in education related to preventing and managing abuse can improve emergency nurses' verbal abuse mitigation skills.
- Nurse leaders must advocate for immediate debriefing following incidents of verbal abuse, signalling the importance of processing workplace violence, critical incidents, and difficult clinical cases.
- Nurse leaders must allocate paid time for nurses to complete continuing education related to violence prevention.

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Conflicts of Interest

None

Authors' contributions

JZ conceived this study. LC and KC contributed to study design. JZ developed the study protocol under the guidance of LC. Data collection and analysis was performed by JZ in consultation with LC. JZ, LC and KC prepared, revised and approved the manuscript.

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Déception professionnelle chez le personnel infirmer des urgences : Une étude qualitative et descriptive

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Résumé

Contexte : La déception professionnelle est une nouvelle notion dans les soins infirmiers d'urgence. C'est le sentiment d'être découragé par son choix de carrière. Elle découle d'une violence verbale répandue et non traitée dans le service des urgences, infligée aux infirmières par les patients ou leurs visiteurs. La déception professionnelle est une notion différente de l'épuisement professionnel et de la fatigue de la compassion. Dans le cadre de la pandémie de COVID-19, il faut reconnaître ce phénomène et comprendre ses implications tout en envisageant des stratégies pour l'atténuer.

Méthodes : Pour mener à bien cette étude, nous avons utilisé une méthodologie qualitative descriptive. Les infirmières ont été interrogées afin d'explorer la question suivante : comment les infirmières des services d'urgence vivent-elles la déception professionnelle suite à la violence verbale ?

Constatations : On a identifié trois thèmes clés : (1) les expériences des infirmières en matière de déception professionnelle ; (2) les réponses des infirmières à la déception professionnelle ; (3) les préoccupations des infirmières concernant la déception professionnelle. Bien que des politiques organisationnelles soient en place pour faire face à la violence verbale, l'élaboration d'une procédure jointe à la politique permettrait de guider les infirmières dans la gestion de cette violence. Le défaut de mise en œuvre de ces mesures par les infirmières-chefs contribue à la déception professionnelle des infirmières, ce qui affecte leur pratique, leur santé mentale et leur maintien en poste. Même si ces conséquences ne sont pas nouvelles, la pandémie de COVID-19 a accentué ce phénomène. L'ampleur de la violence verbale à laquelle les infirmières d'urgence sont actuellement confrontées a augmenté en flèche ; cela confère une nouvelle urgence à l'action stratégique.

Conclusion : La déception professionnelle est une conséquence qui résulte directement de la violence verbale et indirectement de l'incapacité de l'organisation à soutenir les infirmières et à leur donner les moyens d'atténuer cette violence.

Mots clés : Service d'urgence, Personnel infirmier d'urgence, Déception professionnelle, Abus verbal, Violence verbale

Les travailleurs de la santé sont fréquemment victimes de violences verbales. Le personnel infirmier travaillant dans les services d'urgence est particulièrement vulnérable à ce type de violence (Al-Shamlan et coll., 2017 ; Partridge et Affleck, 2017). Le personnel infirmier des services d'urgence est visé par la violence verbale parce qu'il prodigue des soins à des patients

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tendus ou agressifs, ainsi qu'à ceux qui sont sous l'influence de drogues ou d'alcool (Al-Shamlan et coll., 2017 ; Banda et coll., 2016 ; Copeland et Henry, 2017 ; Partridge et Affleck, 2017 ; Pich et coll., 2017 ; Zhang et coll). Pour certains membres du personnel infirmier des services d'urgence, la violence verbale fait partie du travail (Hogarth et coll., 2016 ; Hyland et coll., 2016). La violence verbale est si présente dans le travail quotidien du personnel infirmier des urgences, et elle se produit si fréquemment, que ces derniers ne la considèrent pas du tout comme de la violence (Baig et coll., 2018). Cette tolérance à l'égard de la violence verbale peut sembler être une attente du travail des soignants plutôt qu'une anomalie ; cela peut expliquer en grande partie pourquoi la violence verbale continue d'être répandue dans les services d'urgence.

Par ailleurs, les effets négatifs de la violence verbale se traduisent par la perte de concentration au travail et l'épuisement mental du personnel infirmier, ce qui a un impact sur les soins aux patients (Hassankhani et coll., 2017 ; Yoon et Sok, 2016). Il existe également des impacts au niveau organisationnel tels que l'augmentation des congés maladie, les démissions et les difficultés de recrutement (Howerton Child et Sussman, 2017 ; Li et coll, 2017).

Enfin, les infirmières entrent dans la profession parce qu'elles veulent aider les gens. Subir ensuite de la violence verbale, ce qui est décourageant, peut finalement entraîner une déception professionnelle (DP) (Howerton Child et Sussman, 2017, p. 547Surtout, le DP se distingue de l'épuisement professionnel et de la fatigue de compassion. L'épuisement professionnel est une réponse chronique à des situations récurrentes de stress. La fatigue de compassion est subite et résulte de l'exposition au traumatisme d'une autre personne. La DP est unique, car on ne considère pas qu'elle soit de nature traumatique, mais les effets négatifs sont perceptibles, dirigés vers le personnel infirmier des urgences et ressentis par celui-ci [Howerton Child et Sussman, 2017]. Ce phénomène se traduit par un sentiment d'insatisfaction quant au choix de carrière découlant d'une violence verbale endémique ignorée [Hassankhani et coll., 2017 ; Howerton Child et Sussman, 2017].

Le risque que la pandémie de COVID-19 aggrave la DP est préoccupant, car les mauvais traitements infligés aux infirmières et aux travailleurs de la santé ont augmenté pendant la pandémie de COVID-19 [Alsuliman et coll., 2021 ; Bitencourt et coll., 2021 ; Devi, 2020 ; Yang et coll., 2021]. Il faut ajouter à cela que le personnel infirmier travaille dans des conditions extraordinairement difficiles. L'orientation des patients et de leurs familles dans le système de santé est devenue complexe et difficile. À certains moments, pendant COVID-19, les ressources en matière de soins de santé ont été rares et une controverse a entouré la distribution équitable de celles-ci. Ces situations controversées et très stressantes ont inévitablement conduit à des abus envers les travailleurs de la santé, tant sur le lieu de travail que dans les espaces publics au sein de leurs communautés [Alsuliman et coll., 2021 ; Bitencourt et coll., 2021 ; Dye et coll., 2020 ; Larkin 2021 ; Yang et coll., 2021].

Méthodes

Plan et question de recherche

Dans le domaine des soins infirmiers, la recherche en méthodologie qualitative descriptive [QD] examine des phénomènes tels que les préoccupations et les réactions des personnes face à des événements [Bradshaw et coll., 2017 ; Kim et coll., 2017]. Compte tenu de ce contexte, la méthodologie QD a été employé pour répondre à la question de recherche suivante : comment le personnel infirmier des services d'urgence vit-il la DP à la suite d'une agression verbale ? Ce sujet intéressait particulièrement l'auteure principale, une infirmière autorisée travaillant dans un service d'urgence, qui avait été victime de violence verbale de la part de patients et de leurs familles. L'auteure principale est devenue de plus en plus consciente d'incidents d'abus envers le personnel, tant en personne que sur des plateformes en ligne. Au fil du temps, elle a également constaté un changement dans le ressenti du personnel à l'égard du service d'urgence et des patients qu'il sert. Cette étude est conforme aux directives de l'« *Adherence to Consolidated Criteria for Reporting Qualitative Studies* » [COREQ] [Tong et coll., 2007].

Échantillon

Un échantillonnage dirigé a été utilisé pour recruter six infirmières âgées de 24 à 43 ans possédant de 2 à 18 ans d'expérience. L'échantillonnage dirigé permet de recruter des participants qui possèdent l'expérience requise pour l'étude [Bradshaw et coll., 2017] ; car il est conçu de manière stratégique pour obtenir des données riches en informations afin d'en révéler des connaissances [Patton, 2015]. Dans les études de recherche QD, la taille des échantillons est relativement petite et la recherche est axée sur un contact approfondi avec les participants [Bradshaw et coll., 2017]. Les six participants à cette étude représentaient une variété d'âges et d'années d'expérience en soins infirmiers et le personnel infirmier travaillait dans deux des quatre services d'urgence. Une taille d'échantillon satisfaisante est celle qui permet de répondre suffisamment à la question tout en obtenant des données riches en informations [Bradshaw et coll., 2017 ; Sandelowski, 2000]. Dans ce contexte, la chercheuse a déterminé que la taille de l'échantillon était adéquate pour cette étude QD.

Les critères d'inclusion des infirmières participant à l'étude sont les suivants : travailler ou avoir travaillé dans l'un des quatre services d'urgence d'un grand hôpital situé dans un centre urbain de l'est du Canada ; avoir été victime de violence verbale de la part de patients ou de visiteurs ; s'identifier comme ayant vécu le DP et être en mesure de fournir un éclairage contextuel sur cette expérience.

L'approbation du Comité d'éthique de la recherche [CER] [dossier n° 23900] a été obtenue auprès de l'établissement postsecondaire dans lequel l'auteure principale était inscrite au moment de l'étude. De plus, l'approbation du CER [RID# 2020-005] a été obtenue de la société hospitalière dans laquelle se trouvaient les quatre urgences où les participants ont été recrutés. Nous avons envoyé des courriels de recrutement aux infirmières employées dans les quatre services d'urgence. La chercheuse a expliqué l'étude aux candidats potentiels qui ont répondu au courriel de recrutement. Le consentement éclairé a

été obtenu de tous les participants. Tous les participants qui ont consenti à l'étude ont complété les entrevues ; aucune attrition n'a été enregistrée.

Collecte et analyse des données

Les données ont été recueillies à partir d'entrevues approfondies et semi-structurées d'une durée maximale de 40 minutes. Ce type d'entretien est la principale source de collecte de données dans le cadre d'une recherche sur les DQ [Bradshaw et coll., 2017 ; Sandelowski, 2000, 2005]. Les entrevues ont été menées exclusivement par l'auteure principale, sous la direction de la seconde auteure. Sous la direction et la supervision de la deuxième auteure, l'auteur principal a élaboré le guide d'entretien. Les questions d'entrevue ont été élaborées à partir d'un examen de la documentation pertinente et du savoir en matière d'entrevue qualitative [Kvale et Brinkman, 2009]. Au début de chaque entrevue, la chercheuse et le participant ont établi une relation de confiance grâce aux liens fraternels ; l'auteure principale a décrit son rôle d'infirmière autorisée aux urgences avec une décennie d'expérience, son intérêt pour le DP et ses objectifs de faire la lumière sur sa signification au sein de la culture des soins infirmiers aux urgences. Au cours du processus de recherche, l'auteure principale a tenu un journal de bord et a participé à des comptes rendus réguliers avec l'auteure secondaire. Les participants ont été interrogés par téléphone. Les entrevues ont été réalisées en septembre et octobre 2020. Une fois le consentement éclairé obtenu, les entrevues ont été enregistrées sous forme numérique. Voir le tableau 1 pour les questions posées lors de l'entretien.

Tableau 1

Questions d'entretien

1. Comment interprétez-vous ou comprenez-vous le terme « déception professionnelle » ?
2. Parlez-moi d'une occasion où vous avez été victime d'une agression verbale de la part d'un patient ou de son visiteur, ce qui vous a conduit à un sentiment de déception professionnelle.
3. Quelles sont les mesures que vous avez prises, ou n'avez pas prises, pour répondre à la violence verbale d'un patient à votre égard ?
4. En quoi le sentiment de déception professionnelle a-t-il changé ou modifié la façon dont vous pratiquez les soins infirmiers ?
5. Croyez-vous que les dirigeants s'occupent de la déception professionnelle du personnel infirmier d'urgence ?
6. À votre avis, que peut-on faire pour gérer efficacement les expériences de déception professionnelle vécues par les infirmières d'urgence ?

Les enregistrements audio numériques ont été transcrits textuellement. Les transcriptions ont été rendues anonymes et importées dans NVivo [publié en mars 2020]. Des notes d'observation ont été rédigées à la suite de tous les entretiens. Les données recueillies lors des entretiens ont été analysées à l'aide d'une analyse de contenu qualitative, une stratégie fréquemment employée par les chercheurs de la méthodologie QD [Vaismoradi et Snelgrove, 2019]. L'analyse de contenu qualitative est une démarche inductive dont le but est de déduire des concepts, des thèmes ou un modèle par interprétation à partir de données brutes [Vaismoradi et Snelgrove, 2019]. En suivant cette démarche, l'auteure principale a réduit les données en unités codées. La comparaison continue a permis d'identifier les événements, de les comparer aux thèmes émergents et de mettre en évidence les idées principales sous forme de codes liés au phénomène [Vaismoradi et Snelgrove, 2019]. Les sous-thèmes qui sont ressortis des données comprennent le soutien organisationnel, la santé mentale du personnel infirmier, la pratique des soins infirmiers et le sentiment d'impuissance. L'auteure principale a identifié et catégorisé les codes dans les thèmes principaux des expériences, des préoccupations et des réponses des infirmières au DP. Une fois les thèmes et sous-thèmes élaborés, chaque transcription a été réanalysée selon un processus itératif de lecture, de révision et de peaufinage.

Résultats

Trois thématiques principales ont été soulevées à partir des données relatives au personnel infirmier des services d'urgence et au phénomène de DP : 1) les expériences des infirmières en matière de DP (comprenant les sous-thèmes de l'impuissance et de la normalisation) ; 2) les réactions des infirmières à la DP (ayant pour sous-thèmes les changements dans la pratique infirmière, le maintien en poste et la santé mentale du personnel infirmier) ; 3) les préoccupations du personnel infirmier en matière de DP (le leadership inefficace était un sous-thème de l'étude.

Expériences du personnel infirmier en matière de DP

Impuissance

Le personnel infirmier se sent souvent impuissant face à la violence verbale subie à l'urgence. Ils ont déclaré que la politique ministérielle relative à la violence verbale était rarement appliquée, suscitant un sentiment d'impuissance : « *Nous avons ce code de conduite… tout un beau papier affiché au mur sur le comportement des patients… sauf que le leur est toléré et pas le nôtre… on finira toujours par dire que nous [les infirmières et infirmiers] aurions dû agir différemment.* » La crainte d'être qualifiée de « mauvaise infirmière » en ligne sur les médias sociaux pesait également sur les infirmières, contribuant au sentiment d'impuissance : « *Je n'ai pas revu cette infirmière depuis qu'elle [la patiente] a fait ça. Elle a chassé une excellente infirmière chevronnée de notre service des urgences à cause de quelques commentaires qu'elle a écrits [sur Facebook].* » Pour cette infirmière, la DP a persisté en ligne sur une publication Facebook racontant un récit unilatéral d'un échange entre un patient et une infirmière bien après les faits : « *Il existe maintenant une histoire fausse en ligne et votre visage y est attaché… vous n'avez pas l'occasion de vous défendre… vous n'avez pas la possibilité de dire "ce n'est pas ce qui s'est réellement passé.* » La crainte d'être abusé verbalement en ligne de manière

anonyme a été évoquée en détail par le personnel infirmier interrogé, signalant l'impact et l'importance que les commentaires sur les médias sociaux peuvent avoir sur les expériences du personnel infirmier en ce qui concerne la DP.

Normalisation

Le fait que les infirmières des services d'urgence normalisent la violence verbale se reflète dans l'absence de conséquences pour le comportement abusif des patients : « *Je trouve qu'ils n'ont que très peu de conséquences sur leur comportement, alors cela devient normal parce que… ils le font tout le temps et il n'y a aucune conséquence à leurs actions… on s'y habitue. C'est très normalisé.* » Le personnel infirmier s'est demandé comment il était censé gérer cette violence alors qu'il n'y avait aucune discussion ouverte à ce sujet. Par conséquent, ils ont poursuivi leur travail sans s'occuper de la question : « *Que se passe-t-il quand un patient vous crie après ? Comment faites-vous pour surmonter cette situation ? Comment faire pour que cela n'affecte pas vos soins ? Comment abordez-vous le patient ? … Ces discussions n'ont pas lieu du tout.* »

Réactions des infirmières au DP

Les réactions sont claires quant à l'influence profonde de la DP sur la pratique des soins infirmiers, la santé mentale du personnel infirmier et le maintien de celui-ci dans le système de santé.

La pratique infirmière

Le personnel infirmier a indiqué que la DP a influencé sa pratique par la suite, se répercutant sur les soins aux patients. Par exemple, dans la salle d'attente, une infirmière a décrit sa façon de penser avant de s'occuper d'un patient impoli : « *On consulte le dossier du patient et on se dit qu'il est tellement impoli qu'il peut probablement attendre. On essaie de ne pas le faire, mais c'est très difficile quand quelqu'un nous attaque personnellement et qu'on doit ensuite aller s'occuper de lui.* » L'infirmière a envisagé un traitement punitif à l'encontre du patient ayant un comportement abusif. C'est une stratégie réactive courante.

Le comportement instinctif a également été mentionné comme un moyen de gérer les émotions face à la violence verbale tout en restant capable de continuer à travailler : « *Je suis comme plus plate que plate, je n'aurai pas la même réponse… Je me dis [à moi-même] : "Pourquoi fais-tu ça ?" Mais je ne peux pas m'en empêcher. Je ne peux pas m'empêcher d'être très sèche. C'est terrible.* »

Une infirmière a remarqué que sa pratique changeait lorsqu'elle soignait des patients difficiles :

« *[vous avez] déjà mise à part cette personne dans votre esprit… Je ne crois pas que vous passeriez votre temps mort à bavarder avec des patients comme ça pour obtenir plus d'informations… Pourquoi voudriez-vous passer du temps avec quelqu'un qui vient de vous engueuler ?* » Le « temps mort » fait référence aux quelques moments au travail où les infirmières ne sont pas débordées par des tâches urgentes. C'est souvent le seul moment pour enseigner la santé et découvrir des aspects subtils dans les historiques de santé des patients. Mais, le fait de se sentir épuisé par la maltraitance d'un patient empêche le personnel infirmier de découvrir des informations importantes et peut nuire aux soins personnalisés.

Maintien en poste

Les retombées de la DP sur le bien-être des infirmières et son impact ultérieur sur leur maintien dans la profession sont évidents : « *Je ne travaille pas à plein temps aux urgences, parce que pour moi, cela n'en vaut pas la peine… Je préfère ne pas gagner d'argent le lendemain plutôt que de me faire crier après et d'*être traitée de manière inappropriée et… *que rien ne soit jamais fait pour régler le problème.* » Par ailleurs, l'impact sur les nouveaux diplômés dans le contexte de la durabilité d'une longue carrière en tant qu'infirmier(ère) des services d'urgence a été confirmé : « *Je suis une nouvelle infirmière… En sortant de la formation d'infirmière, je savais que je voulais être une infirmière d'urgence… Je lutte contre cela en ce moment… Voilà deux ans que j'exerce une profession que je dois faire pendant 30 ans. Maintenant, chaque fois que je dois prendre ma voiture pour aller travailler, chaque seconde, je cherche sur Google ce que je pourrais faire de ma vie.* »

Il n'est donc pas surprenant qu'en raison de ces abus continus, le personnel infirmier soit épuisé, découragé et quitte la profession avec le sentiment d'être insatisfait, non reconnu et non apprécié par les patients et les administrateurs de l'hôpital, comme l'exprime le témoignage de cette infirmière : « *Je suis partie en moins de deux ans parce que j'*étais constamment déçue. En tant qu*'infirmière, il est impossible d'obtenir une ordonnance restrictive contre un patient. Il peut tout à fait vous agresser et c'est vous qui devez trouver un nouvel emploi si vous êtes mal à l'aise, car vous ne pouvez pas refuser l'accès à quelqu'un dans un service d'urgence, donc… vous n'obtiendrez jamais d'ordonnance restrictive, c'est vous qui devez trouver un nouvel emploi.* »

La santé mentale du personnel infirmier

Les répercussions profondes sur la santé mentale des infirmières ont été une conséquence importante de la DP, résultat qui n'est pas surprenant. Les infirmières ont fait remarquer que les événements difficiles survenus aux urgences étaient notés, traités et accompagnés de recommandations de changement, mais que la violence verbale et le sentiment persistant de déception professionnelle n'étaient jamais résolus. En ce qui concerne les épisodes d'agression des patients, une infirmière a affirmé : « *Je trouve que je suis anxieuse. Je suis anxieuse pendant un certain temps après ces épisodes. Cela me rend très mal à l'aise.* »

Une infirmière expérimentée a décrit que la santé mentale du personnel infirmier des services d'urgence a gagné en importance aux yeux des dirigeants uniquement lorsqu'elle a pris une valeur financière : « *Je ne pense pas qu'il n'y ait jamais de conversation [sur la DP]. Si vous êtes en [congé] de santé mentale… ils se préoccupent de vous, mais pas des gens qui s'en sortent simplement… mais si ça touche le budget, on y réfléchira peut-être.* » Il faut souligner que les facteurs de stress de la DP s'infiltrent dans la vie personnelle des infirmières bien au-delà de leur quart de travail : « *Les souvenirs de violence verbale apparaissent dans vos rêves, ou lorsque vous êtes avec vos amis… vous leur expliquez une situation et ils vous regardent comme si vous étiez sur une autre planète. Ils répondent : « Moi, ça ne m'arrive pas au travail.* »

Préoccupations des infirmières vis-à-vis la DP

Inefficacité du leadership infirmier et organisationnel

Les infirmières ont établi un lien entre leur expérience DP et l'inefficacité du leadership infirmier et organisationnel. Les infirmières, en tant que personnel de première ligne, ont indiqué qu'elles ne pouvaient pas atténuer les problèmes attribuables à

la violence verbale, comme le manque de personnel et l'engorgement. Ces problèmes doivent être gérés par des dirigeants tels que les infirmières gestionnaires des services d'urgence et de l'hôpital. Les infirmières ont convenu que leurs expériences de DP n'étaient pas correctement abordées par leurs dirigeants. « *Notre déception professionnelle est influencée par plusieurs choses… Je sais que le flux de patients dans notre service est un facteur énorme d'abus verbal. En première ligne, nous n'avons aucun contrôle sur cela… s'il vous plaît, ne vous défoulez pas sur nous.* »

Les dirigeants omettent souvent de reconnaître les incidents de violence verbale ou de proposer des stratégies pour y remédier. Cette négligence était préoccupante pour les infirmières : « *Je crois que, premièrement, l'entreprise ne nous soutient pas, et que, deuxièmement, elle mine activement la situation.* » La réticence à offenser le public est perçue comme une cause fondamentale de l'absence de dénonciation explicite de la violence verbale envers les infirmières : « *Je pense qu'ils ont trop peur d'empiéter sur les plates-bandes du public alors qu'ils devraient protéger leurs employés* » et « *J'ai été témoin de nombreuses fois où nous avons été agressés verbalement par un patient, et où la direction est allée les chercher, leur a serré la main et les a raccompagnés [le patient ou le visiteur] à la porte d'entrée. Pour moi, on ne fait que dire "Vous pouvez faire ce que vous voulez ici" au lieu de dire 'C'est tolérance zéro… vous devez partir.* » En ce qui concerne la direction des services d'urgence, la crainte des réactions négatives face à la dénonciation des abus verbaux à l'encontre des infirmières s'étend au monde virtuel : *"Je dirais qu'il y a beaucoup de peur entourant cette affaire de Facebook… la plupart des réactions de la direction [sont] basées sur la peur… au lieu d'une société entière… qui déclare :* « *C'est notre mission, si les patients ne sont pas satisfaits, alors tant pis pour eux, mais nous ne laisserons pas nos infirmières se faire maltraiter ou subir d'autres comportements de ce genre.". Je ne sais pas si c'est l'hôpital ou si c'est par peur… de perdre [leur] emploi, d'*être mis en cause et tout ça… *"*

Le manque de formation pour intervenir efficacement en cas de violence verbale et pour atténuer potentiellement la DP a été exprimé : « *Je ne pense pas que vous receviez une formation quelconque pour vous aider à savoir comment réagir lorsque vous êtes attaqué verbalement dans ce service.* » Il a été réaffirmé que les infirmières ne disposaient pas de stratégies claires en cas de violence verbale : « *Nous n'avons pas vraiment de règle claire et concise concernant les étapes à suivre si un patient agit de la sorte, par exemple, certaines personnes restent plantées là… et certains d'entre nous se fâchent.* » Toutes les infirmières interrogées ont affirmé que les dirigeants devaient avouer l'existence de la DP et qu'il fallait mettre en place des stratégies pour l'atténuer dès son apparition, c'est-à-dire lorsqu'une infirmière est victime de violence verbale aux urgences.

Discussion

La déception professionnelle se révèle être un phénomène relativement nouveau. Elle peut être ressentie par le personnel infirmier des urgences à la suite d'abus verbaux de la part des patients ou de leurs visiteurs (Howerton Child et Sussman, 2017). La déception professionnelle se distingue de la fatigue de compassion, qui est brusque et qui découle du traumatisme d'une autre personne, et de l'épuisement professionnel chronique lié à des facteurs de stress répétés (Howerton Child et Sussman, 2017). Dans la présente étude, le personnel infirmier a déclaré avoir vécu la DP en raison d'une violence verbale persistante et ignorée au travail et, dans une certaine mesure, en ligne. Le personnel infirmier a exprimé un sentiment d'impuissance et a banalisé la violence comme étant normale et faisant partie du milieu de travail dans un service d'urgence. Afin de tempérer l'effet de la DP, le personnel infirmier a modifié sa pratique en prodiguant un minimum de soins ou, ultimement, il a quitté le service des urgences à la recherche d'un autre emploi. La déception professionnelle a des conséquences sur la santé mentale du personnel infirmier. La présente étude montre que la DP se manifeste par le fait que le personnel infirmier se sent stressé et anxieux au travail, et que ces sentiments persistent lorsqu'il rentre chez lui. Il avait le sentiment de ne pas être soutenu par les responsables des services infirmiers et de l'organisation. Les politiques hospitalières de « tolérance zéro » ont été évoquées, mais l'incapacité à les appliquer était évidente. Ce qui est intéressant, c'est que Howerton Child et Sussman (2017) ont révélé que l'implication et le soutien de la direction étaient des facteurs neutres en ce qui concerne la DP. Or, il est proposé que les gestionnaires s'engagent auprès du personnel pour faire connaître le soutien qu'ils sont en mesure d'offrir (Howerton Child et Sussman, 2017, p. 550).

Depuis le début de la pandémie de COVID-19, on constate une augmentation de la violence à l'encontre du personnel infirmier et soignant (Alsuliman et coll., 2021 ; Bitencourt et coll., 2021 ; Devi, 2020 ; Larkin, 2021 ; Yang et coll., 2021). Cette intensification de la violence souligne l'urgence de la portée de cette étude. Les points suivants présentent plusieurs implications pour les dirigeants des organismes de soins infirmiers et de santé concernant l'atténuation de la DP chez le personnel infirmier des services d'urgence.

Les organismes doivent encourager et soutenir les infirmières à signaler les incidents de violence verbale (Al-Shamlan et coll., 2017 ; Hassankhani et coll., 2017 ; Hogarth et coll., 2017 ; Lenaghan et coll., 2018 ; Organisation mondiale de la santé, OMS, 2021). En déclarant la maltraitance, on la reconnaît officiellement. Bien que des recherches antérieures indiquent la nécessité d'une politique (Hassankhani et coll, 2017 ; Hogarth et coll, 2017 ; OMS, 2021 ; Yang et coll., 2021), les résultats de la présente étude correspondent à ces recherches et pourraient être adaptés à un niveau local. Une démarche détaillée permettrait au personnel infirmier de disposer d'un algorithme à suivre en cas de violence verbale de la part de patients ou de visiteurs. Le personnel infirmier de première ligne devrait participer à l'élaboration de cette politique ou procédure afin d'atténuer son sentiment d'impuissance et la normalisation de la violence comme étant une attente au travail à l'urgence. Cela permettrait de faire comprendre que la violence verbale ne peut être tolérée et d'atténuer un facteur important de la DP. Il ne faut pas sous-estimer l'importance de soigner et de soutenir la santé mentale du personnel infirmier (Havaei, 2021 ; Liu et coll., 2020 ; OMS 2021). La Fédération canadienne des syndicats d'infirmières et infirmiers (2017) a reconnu que la violence dans les établissements de santé a un sérieux impact sur la santé mentale des infirmières et infirmiers. Une exécution intentionnelle et systématique des

directives et des procédures pourrait grandement contribuer à réduire les effets de la violence verbale et de la DP sur la santé mentale du personnel infirmier.

Le maintien en poste du personnel infirmier dans la profession est un problème mondial (Efendi et coll., 2019 ; Marufu et coll., 2021). Du point de vue économique et pragmatique, les défis liés au maintien des infirmières entraînent une augmentation des coûts et créent des problèmes de personnel en raison du recrutement et du déploiement de personnel infirmier non qualifié compromettant la qualité des soins (Ashton et coll., 2018 ; Howerton Child et Sussman, 2017 ; Yoon et Sok, 2016. L'adoption de politiques et de procédures précises relatives à l'intolérance à l'égard des mauvais traitements est l'occasion pour les dirigeants infirmiers de démontrer qu'ils continuent d'investir dans leur personnel infirmier qualifié aux urgences.

Il convient que le personnel infirmier des services d'urgence bénéficie d'un soutien accru de la part de son organisme et de ses dirigeants, et qu'il reçoive une formation avancée pour reconnaître la violence et le harcèlement et savoir y réagir (Al-Qadi, 2020 ; Aljohani et coll., 2021 ; Ashton et coll., 2018 ; OMS, 2021). Parmi les recommandations internationales visant à lutter contre la violence sur le lieu de travail se trouvent des séances d'information sur les problèmes de sécurité potentiels ainsi que des séances d'information à la suite d'incidents de violence (OMS, 2021). Ces recommandations reflètent les réponses du personnel infirmier de la présente étude, qui préconise la tenue d'un compte rendu à la suite d'un incident de violence à l'urgence, ainsi qu'une formation supplémentaire pour reconnaître la violence verbale et y remédier efficacement. Dans le cadre de cette étude, le personnel infirmier a reconnu qu'il souhaitait acquérir les compétences nécessaires pour faire face à ses sentiments de DP après avoir côtoyé des patients difficiles. À cette fin, un groupe de soutien par les pairs pourrait servir d'environnement propice à l'expression des sentiments. La recherche indique que le personnel infirmier bénéficierait d'une formation supplémentaire sur la prévention et la gestion de la maltraitance aux urgences (Aljohani et coll., 2021 ; Ashton et coll., 2018 ; Hassankhani et coll., 2017 ; Yoon et Sok, 2016. Bien que le personnel infirmier soit tenu de perfectionner ses compétences en matière de sauvetage cardiaque, il est impératif d'envisager de l'aider à renouveler périodiquement ses compétences et ses connaissances en matière de gestion de la violence et du harcèlement. Howerton Child et Sussman (2017) affirment que la formation à la prévention de la violence doit être adaptée à l'environnement aigu et pressé des urgences.

Une abondante littérature décrit en détail les mauvais traitements infligés au personnel infirmier et aux travailleurs de la santé dans les services d'urgence (Aljohani et coll., 2021 ; Ashton et coll., 2018). Cependant, la description du phénomène de la DP est nouvelle. Le fait d'admettre que la violence verbale est un précipitant de la DP est remarquable. Ensuite, l'impact ultérieur sur le maintien en poste des infirmières, leur santé mentale et leur bien-être général à la suite de la DP est aussi remarquable. Des études menées pendant la pandémie de COVID-19 ont démontré que la violence verbale est largement vécue par le personnel infirmier et les travailleurs de la santé (Bitencourt et coll., 2021 ; Yang et coll., 2021). La pandémie a accentué l'urgence d'une réflexion collective suivie d'une action stratégique délibérée, d'après cette recherche et les nombreuses études qui l'ont précédée.

Limitations

Le présent rapport comporte plusieurs limites. Premièrement, l'échantillon de l'étude se limite à deux urgences de la région sanitaire dans laquelle le personnel infirmier travaille ou a travaillé. Il est possible que les résultats de cette étude ne puissent être transposés à des situations autres que celles dont le contexte est très similaire. Deuxièmement, en raison de la pandémie de COVID-19, les entretiens qui auraient été menés en présentiel l'ont été par téléphone. De plus, tous les participants ont choisi d'être interviewés par téléphone même si la conférence virtuelle a été offerte. Cela a posé une limite potentielle, car l'engagement du chercheur et du participant, qui se manifeste par des nuances dans le langage corporel ou l'expression du visage lors de la discussion d'un sujet sensible comme la DP, n'a pas pu être observé et noté dans le cadre de la collecte de données.

Conclusion

La recherche sur la DP en tant que phénomène subi directement par le personnel infirmier d'urgence en raison de la violence verbale est essentielle, étant donné le lourd fardeau qu'elle représente tant pour le personnel infirmier que pour les patients. Sachant que la pandémie de COVID-19 a exacerbé les facteurs de stress dans un système déjà tendu, le personnel infirmier est victime d'agressions verbales au travail alors qu'il est paradoxalement salué comme un héros de première ligne. Les préoccupations et les expériences de vie du personnel infirmier dans la présente étude semblent indiquer que la DP se produit à cause de la violence verbale, mais aussi indirectement à cause des lacunes organisationnelles. Cela témoigne d'un cri de ralliement qui est évident lorsque la voix du personnel infirmier amplifie et conteste ce qui ne devrait pas être toléré dans le cadre de son travail. Les résultats de cette enquête révèlent que la DP a des effets néfastes sur le maintien en poste du personnel infirmier, sa santé mentale et sa pratique. L'avenir de la recherche devrait explorer la DP afin de mieux comprendre ses causes profondes et ses solutions potentielles. Toutefois, la reconnaissance de ce phénomène unique demeure une première étape importante.

Implications pour la pratique clinique des urgences

- Le personnel infirmier d'urgence doit connaître les politiques en vigueur de son établissement en matière de violence verbale sur le lieu de travail
- Suivre une formation sur la prévention et la gestion de la maltraitance peut améliorer les compétences du personnel infirmier d'urgence en matière d'atténuation de la violence verbale
- Les dirigeants infirmiers doivent préconiser un compte rendu immédiat après des incidents de violence verbale, faisant comprendre l'importance de la prise en charge de la violence au travail, des incidents critiques et des cas cliniques difficiles
- Les dirigeants infirmiers doivent allouer du temps rémunéré aux infirmières pour suivre une formation continue sur la prévention de la violence

Les auteures

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Conflits d'intérêts

Aucun

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ENC(C) Questions Summer 2022

Section Editor: Heather McLellan MEd, BN, RN, CEN, CFRN, FAASTN

Authors: Heather McLellan MEd, BN, RN, CEN, CFRN, FAASTN; Leanne Tyler MN, RN, MHN, ENC(C), Margaret Dymond BSN, RN, ENC(C), FAEN

1. You are receiving care of a 7-year-old patient who had fallen off of the dock into a local lake. Critical first look indicates that the child is moving spontaneously, has increased work of breathing and is pale. They are coughing and tells you that breath sounds are coarse throughout with expiratory wheezing. They suspect the child has aspirated water from the lake. Which of the following complications are you concerned about for this child based on this brief assessment?
   A. Noncardiogenic pulmonary edema resulting from surfactant wash out
   B. Pulmonary hypertension resulting from laryngospasm with submersion
   C. Hyperthermia related to a generalized inflammatory response to dirty lake water
   D. Pulmonary emboli related to stasis in the pulmonary circulation

2. You are caring for a patient with an active upper gastrointestinal (GI) bleed. Vital signs are BP 100/58, HR 100, RR 20 SpO_2 93% on room air. The cardiac monitor shows a second-degree heart block. The physician suspects the bleed is variceal and asks you to give octreotide. Which of the following is true regarding precautions for administration of octreotide?
   A. It increases thyroid stimulating hormone (TSH) production and can exacerbate hyperthyroidism
   B. Caution should be exercised because the patient also has second-degree heart block
   C. Kidney function tests must be obtained prior to administration
   D. Confusion and/or delirium may result following administration

3. A 66-year-old patient arrives to the emergency department (ED) with right-sided weakness and slurred speech for 1.5 hours prior to arrival. Vital signs are BP 202/112 mmHg, HR 67 RR 18, SpO_2 96%, temperature 37.2°C. The physician reports the CT scan of the head is normal. The patient is having an acute ischemic stroke meeting criteria for thrombolytic therapy. Which order is the correct sequence for medication administration?
   A. Heparin, thrombolytic agent, antihypertensive agent
   B. Thrombolytic agent, antihypertensive agent, acetylsalicyclic acid, heparin
   C. Antihypertensive agent, thrombolytic agent, acetylsalicyclic acid
   D. Antihypertensive agent, acetylsalicyclic acid, thrombolytic agent, heparin

4. An active shooter has been declared in the emergency department. Which of the following is the most appropriate response for the emergency nurse?
   A. Hide
   B. Run.
   C. Fight.
   D. Call 911.

5. You are caring for a 15-year-old female patient presenting with fatigue and extreme weight loss. Further assessment reveals orthostatic hypotension, tachycardia, electrolyte abnormalities (hyponatremia, hypokalemia, hypocalcemia), hypoglycemia, metabolic acidosis, peripheral edema, and cool extremities. She informs you that her last menstrual period (LMP) was 6 weeks ago. The patient also presents with a flat affect. Which of the following nursing interventions should you perform first?
   A. Obtain a urinalysis for human chorionic gonadotropin (HCG) test
   B. Administer Dextrose 50% 25 grams IV for hypoglycemia
   C. Initiate continuous cardiorespiratory monitoring to assess for dysrhythmias
   D. Contact pediatric mental health provider for eating disorder referral

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6. A 6-year-old male patient arrives in the ED via ambulance, with paramedics actively engaged in trauma resuscitation. He was struck by a motor vehicle at high speed while riding his bicycle; he was wearing a helmet. The child's parents arrive shortly after the ambulance. Which of the following statements regarding family presence during resuscitation is false?
   A. A trained family support person (e.g., social worker, nurse) should be in place during the resuscitation to ensure the family is aware of what they will see, hear, and smell.
   B. Family presence during resuscitation has been shown to assist with coping and adjustment to loss of a child, recognizing that everything was done.
   C. Family presence during resuscitation should only occur after invasive procedures (e.g., endotracheal intubation, central venous catheter insertion) have been completed.
   D. Current evidence suggests that most health care providers are opposed to family presence during resuscitation due to delayed or prolonged resuscitation events, negative patient outcomes, and litigation.

Answers Key with rationale

1. Correct answer: A

Pulmonary complications are the most common result in pediatric submersion events and require the emergency care team to be vigilant with respiratory assessment and intervention. Aspiration of water is usually minimal, often less than 4 ml/kg (Chandy & Weinhouse, 2021; Midliaccio, 2021) but this aspiration, fresh or salt, causes a "wash out" effect reducing surfactant which can increase alveolar capillary membrane permeability and result in non-cardiogenic pulmonary edema. This can lead to acute respiratory distress syndrome (Migliaccio, 2021; Mttaweh et al, 2015). Victims of submersion injury will more likely be hypothermic from submersion and subsequent exposure. Although pulmonary hypertension may be exacerbated by a submersion incident related to inflammatory mediator release, it is not a primary cause of pulmonary hypertension.

2. Correct answer B

Octreotide is a drug which inhibits serotonin release. It functions in a manner similar to somatostatin and decreases gastric mucosal blood flow, as well as decreasing portal and variceal pressures (Lexicomp,2022; Alberta Health Services (AHS), 2020). Caution is indicated because complete atrioventricular heart block and other conduction abnormalities have been reported. Caution should also be used with any medication that prolongs QTc interval as octreotide can exacerbate those effects. While half-life and clearance of the medication may be prolonged with renal dysfunction, there are no manufacturers' recommendations for testing or dosage adjustment (AHS, 2020; Lexicomp, 2022).

3. Correct answer C

Blood pressure management is the priority before thrombolytic therapy to lessen the chance of related complications, including intracerebral hemorrhage (Bath et al, 2022). Antiplatelet or anticoagulation therapy is not initiated initially in the treatment of acute ischemic stroke patients receiving thrombolytic therapy. Antiplatelet and anticoagulation medications are usually deferred for the first 24 hours following thrombolytic therapy in acute ischemic stroke patients (Bath et al, 2022; Gasecki et al., 2020).

4. Correct answer B

In active shooter situations, the emergency nurse has three options: run, hide, or fight (Jacobson, 2020, p. 356). The nurse's natural instinct may be to help others first; however, they should first ensure their own safety before assisting others. The emergency nurse cannot help others if they become a victim (Schueler, 2020). The nurse must try to remain calm while removing oneself from the path of the shooter (run). If this is not feasible, the nurse's next action is to hide (e.g., turn off lights, barricade doors/windows with large objects) and try to contact 911, followed by fight if in imminent danger (Jacobson, 2020, p. 356).

5. Correct Answer: C

Eating disorders (i.e., anorexia nervosa) can lead to severe physiological consequences, particularly cardiac rhythm disturbances if electrolyte imbalances are present. Electrocardiographic changes may include: "non-specific ST- and T-wave abnormalities, atrial or ventricular tachydysrhythmias, idioventricular conduction delay, heart block, nodal rhythms, ventricular escape, premature ventricular contractions, and prolonged QTc interval" (Pritts, 2020, p. 584). Therefore, the nurse's first priority is to initiate continuous cardiorespiratory monitoring and assess for dysrhythmias. Subsequently, the patient may also require Dextrose 50% administered intravenously due to starvation and malnutrition, but the principles of primary assessment apply here. As with any female patient of child-bearing age, an HCG test should be performed once the patient is stabilized. An HCG test would also confirm if electrolyte abnormalities could be due to pregnancy, given the patient's LMP was 6 weeks ago. It should be noted that eating disorders may also lead to endocrine dysfunction, such as amenorrhea (Gordon et al., 2017). Eating disorders are rooted in mental illness, with a variety of factors increasing one's risk for onset (e.g., biological, social, genetic, psychological) (National Eating Disorder Information Centre, n.d.). Referral to an appropriate mental health provider should be initiated prior to discharge.

6. Correct Answer: D

The practice of family presence during resuscitation and invasive procedures has evolved over the last four decades. Current research shows that most health care providers support the presence of family during resuscitation (Howard, 2020, p. 112). Historically, concerns such as "...interference with care events, disruptive family members, delayed or prolonged resuscitation events, litigation, and distress of health care professionals" (Howard, 2020, p. 113) largely stemmed from providers' perceptions rather than evidence or experiences with family presence during resuscitation (Porter et al., 2014, p. 73). Institutional policy implementation and education regarding family presence have served to further increase providers' support (Howard, 2020; Oczkowski et al., 2015; Porter et al., 2014). Institutional policies should include the role of the *trained* family support person, specifically the provision of emotional support and ongoing explanations, before, during, and after resuscitation (e.g., what they will see, hear, smell) (National Emergency Nurses Association [NENA], 2004, p. 1). Studies suggest that family members present during resuscitation and invasive procedures describe better coping and adjustment to the loss of their

child (Howard, 2020, p. 113); they describe a level of comfort in knowing that everything was done to help their child (Dietrich, 2014, para. 13). Parents stated that they would choose "...to be present again in similar circumstances, would not change their experience, and would recommend being present to other parents" (Howard, 2020, p. 112). The importance of screening of family members appropriate for the bedside is also discussed in the literature. Dietrich (2014) and Oczkowski et al. (2015) suggest that screening of family members should be performed prior to allowing them at the bedside or in the resuscitation room. Family members who are or may become extremely emotionally volatile or aggressive, for example, should be supported via other means.

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Questions de révision pour la CSU(C) — été 2022

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1. Vous soignez un patient de 7 ans qui est tombé du quai dans un lac de la région. Un premier examen critique indique que l'enfant bouge spontanément, qu'il exige un effort respiratoire accru et qu'il est pâle. Il tousse et cela vous indique que les bruits respiratoires sont grossiers avec des sifflements expiratoires. Ils soupçonnent que l'enfant a aspiré de l'eau du lac. D'après cette brève évaluation, quelles sont les complications suivantes qui vous inquiètent pour cet enfant ?
   A. Œdème pulmonaire non cardiogénique résultant du lavage du surfactant pulmonaire
   B. Hypertension pulmonaire résultant d'un laryngospasme avec immersion
   C. Hyperthermie liée à une réaction inflammatoire généralisée à l'eau sale d'un lac
   D. Embolie pulmonaire résultant d'une stase dans la circulation pulmonaire

2. Vous vous occupez d'un patient souffrant d'un saignement gastro-intestinal supérieur (GI) en cours. Les signes vitaux sont les suivants : TA 100/58, FC 100, FR 20, SpO2 93 % à l'air ambiant. Le moniteur cardiaque indique un bloc cardiaque de deuxième degré. Le médecin soupçonne que l'hémorragie est variqueuse et vous demande d'administrer de l'octréotide. Parmi les affirmations suivantes, laquelle est vraie concernant les précautions à prendre pour l'administration de l'octréotide ?
   A. Il augmente la production de l'hormone stimulant la thyroïde (TSH) et peut aggraver l'hyperthyroïdie
   B. Il convient d'être prudent, car le patient souffre également d'un bloc cardiaque du second degré
   C. Des analyses de la fonction rénale doivent être effectuées avant l'administration
   D. L'administration de ce médicament peut provoquer une confusion et/ou un délire

3. Un patient de 66 ans arrive aux urgences avec une faiblesse du côté droit et des troubles d'élocution depuis une heure et demie. Ses signes vitaux sont les suivants : TA 202/112 mmHg, FC 67 FR 18, SpO2 96 %, température 37,2 °C. Le médecin précise que la tomodensitométrie de la tête est normale. Le patient souffre d'un accident vasculaire cérébral ischémique aigu répondant aux critères de la thérapie thrombolytique. Quel est l'ordre correct pour l'administration des médicaments ?
   A. Héparine, agent thrombolytique, agent antihypertenseur
   B. Agent thrombolytique, agent antihypertenseur, acide acétylsalicylique, héparine
   C. Agent antihypertenseur, agent thrombolytique, acide acétylsalicylique
   D. Agent antihypertenseur, acide acétylsalicylique, agent thrombolytique, héparine

4. Un tireur actif a été signalé dans le service des urgences. Laquelle des mesures suivantes est la plus appropriée pour le personnel infirmier des urgences ?
   A. Se cacher
   B. Se sauver en courant
   C. Se défendre
   D. Appeler le 911

5. Vous soignez une patiente de 15 ans qui présente de la fatigue et une perte de poids extrême. Un examen plus approfondi révèle une hypotension orthostatique, une tachycardie, des anomalies électrolytiques (hyponatrémie, hypokaliémie, hypocalcémie), une hypoglycémie, une acidose métabolique, un œdème périphérique et ses extrémités sont froides. Elle vous informe que la date de ses dernières règles remonte à 6 semaines. De plus, elle exhibe une absence d'émotions. Laquelle des interventions infirmières suivantes devez-vous effectuer en premier lieu ?

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A. Effectuez une analyse d'urine pour le test de l'hormone choriogonadotrophique (hCG
B. Administrez 25 grammes de Dextrose 50 % par voie IV pour une hypoglycémie
C. Entreprendre une surveillance cardiorespiratoire continue afin d'évaluer les dysrythmies
D. Communiquer avec un pédiatre spécialiste de la santé mentale afin d'orienter la patiente vers un spécialiste des troubles de l'alimentation

6. Un garçon de six ans arrive aux urgences en ambulance, les ambulanciers procédant à une réanimation traumatologique. Il a été heurté par un véhicule à grande vitesse alors qu'il faisait du vélo ; il portait un casque. Les parents de l'enfant arrivent peu après l'ambulance. Laquelle des affirmations suivantes concernant la présence de la famille pendant la réanimation est fausse ?
   A. Une personne formée au soutien de la famille (par exemple, un travailleur social ou un membre du personnel infirmier) doit être sur place pendant la réanimation pour s'assurer que la famille est consciente de ce qu'elle va voir, entendre et sentir
   B. Il a été démontré que la présence familiale pendant la réanimation aide à faire face et à s'adapter à la perte d'un enfant, en reconnaissant que toutes les mesures ont été prises
   C. La présence de la famille pendant la réanimation ne peut avoir lieu qu'après les procédures invasives (par exemple, intubation endotrachéale, insertion d'un cathéter veineux central
   D. Les données actuelles indiquent que la plupart des fournisseurs de soins de santé seraient opposés à la présence de la famille pendant la réanimation en raison du retard ou de la prolongation des événements de réanimation, des résultats négatifs pour les patients et des litiges

Clé de correction et justification

1. Réponse : A

Les complications pulmonaires sont le résultat le plus courant des accidents de submersion en pédiatrie et exigent une vigilance de l'équipe de soins d'urgence en matière d'évaluation et d'intervention respiratoires. En général, le taux d'aspiration d'eau est minime, souvent inférieur à 4 ml/kg (Chandy et Weinhouse, 2021 ; Midliaccio, 2021), mais cette aspiration, qu'elle soit fraîche ou salée, provoque un effet de « lavage » réduisant le surfactant, ce qui peut augmenter la perméabilité de la membrane capillaire alvéolaire et provoquer un œdème pulmonaire non cardiogénique. Ce phénomène peut être suivi d'un syndrome de détresse respiratoire aiguë (Migliaccio, 2021 ; Mttaweh et coll., 2015). Les victimes de blessures par submersion seront plus probablement hypothermiques en raison de la submersion et de l'exposition ultérieure. Bien que l'hypertension pulmonaire puisse être aggravée par un incident de submersion lié à la libération de médiateurs inflammatoires, il ne s'agit pas d'une cause première d'hypertension pulmonaire.

2. Réponse : B

L'octréotide est un médicament qui empêche la libération de sérotonine. Il agit sur le même mode que la somatostatine et diminue le débit sanguin de la muqueuse gastrique, tout en réduisant les pressions portales et variqueuses (Lexicomp,2022 ; Alberta Health Services (AHS), 2020). Il convient d'être prudent, car un bloc cardiaque auriculo-ventriculaire complet et d'autres anomalies de conduction ont été observés. La prudence est également de mise avec tout médicament qui prolonge l'intervalle QTc, car l'octréotide peut accentuer ces effets. Bien que la demi-vie et la clairance du médicament puissent être prolongées en cas de dysfonctionnement rénal, les fabricants ne fournissent aucune recommandation concernant les tests ou l'ajustement de la posologie (AHS, 2020 ; Lexicomp, 2022).

3. Réponse : C

Afin de réduire les risques de complications, notamment d'hémorragie intracérébrale, il faut prioriser la gestion de la pression artérielle avant le traitement thrombolytique (Bath et coll., 2022). Le traitement antiplaquettaire ou anticoagulant ne sera pas initié en premier lieu dans le traitement des patients ayant subi un AVC ischémique aigu et recevant un traitement thrombolytique. La prise de médicaments antiplaquettaires et anticoagulants est habituellement reportée pendant les 24 premières heures suivant le traitement thrombolytique chez les patients ayant subi un AVC ischémique aigu (Bath et coll, 2022 ; Gasecki et coll., 2020).

4. Réponse : B

Face à un tireur actif, le personnel infirmier d'urgence a trois options : se sauver en courant, se cacher ou se défendre (Jacobson, 2020, p. 356). L'instinct du personnel infirmier peut être d'aider les autres en premier, mais il doit d'abord assurer sa propre sécurité avant d'aider les autres. Le personnel infirmier d'urgence ne peut pas aider les autres s'il devient une victime (Schueler, 2020). Il doit essayer de rester calme tout en s'éloignant de la trajectoire du tireur (se sauver en courant). Si cela n'est pas possible, le personnel infirmier doit alors se cacher (par exemple, éteindre les lumières, barricader les portes et fenêtres avec de gros objets) et essayer de contacter le 911, puis se défendre en cas de danger imminent (Jacobson, 2020, p. 356).

5. Réponse : C

Les troubles de l'alimentation (c'est-à-dire l'anorexie mentale) peuvent avoir des répercussions physiologiques graves, notamment des troubles du rythme cardiaque si l'on constate des déséquilibres électrolytiques. Les modifications électrocardiographiques peuvent inclure : « des anomalies non spécifiques des ondes ST et T, des tachydysrythmies auriculaires ou ventriculaires, un retard de conduction idioventriculaire, un bloc cardiaque, des rythmes nodaux, un échappement ventriculaire, des contractions ventriculaires prématurées et un intervalle QTc prolongé » (Pritts, 2020, p. 584). Ainsi, la priorité de l'infirmière est de procéder à une surveillance cardiorespiratoire continue et d'évaluer les dysrythmies. Par la suite, il se peut que le patient ait besoin de Dextrose 50 % administré par voie intraveineuse en raison de la privation de nourriture et de la malnutrition, mais dans ce cas, les principes de l'évaluation primaire s'appliquent. Comme pour toute patiente en âge de procréer, un test hCG devrait être effectué une fois que la patiente est stabilisée. Ce test permettrait également de confirmer si les anomalies électrolytiques peuvent être dues à la grossesse, étant donné que la patiente a eu ses dernières règles il y a 6 semaines. Soulignons que les troubles de l'alimentation peuvent également entraîner des dysfonctionnements endocriniens, comme l'aménorrhée (Gordon et coll., 2017). Les troubles de l'alimentation découlent d'une maladie mentale, et divers facteurs augmentent le risque que ces troubles se manifestent (p. ex. facteurs biologiques, sociaux, génétiques et

psychologiques) (National Eating Disorder Information Centre, s.d.). L'orientation vers un prestataire de soins de santé mentale approprié doit être initiée avant le congé.

6. Réponse : D

La présence familiale pendant la réanimation et les procédures invasives a évolué au cours des quatre dernières décennies. Les recherches actuelles révèlent que la plupart des prestataires de soins de santé sont favorables à la présence de la famille pendant la réanimation (Howard, 2020, p. 112). Historiquement, les préoccupations telles que « … ingérence dans les événements de soins, membres de la famille perturbateurs, événements de réanimation retardés ou prolongés, litiges et détresse des professionnels de la santé » (Howard, 2020, p. 113) ont été principalement issues des perceptions des prestataires plutôt que des preuves ou des expériences de la présence de la famille pendant la réanimation (Porter et coll., 2014, p. 73). Dans le cadre des politiques institutionnelles, la mise en œuvre et l'éducation concernant la présence de la famille ont permis d'accroître davantage le soutien des prestataires (Howard, 2020 ; Oczkowski et coll., 2015 ; Porter et coll., 2014). Les politiques institutionnelles devraient inclure le rôle de la personne formée au soutien de la famille, en particulier la fourniture d'un soutien émotionnel et le suivi des explications, avant, pendant et après la réanimation (par exemple, ce que la famille verra, entendra et sentira) (Association Nationale des Infirmières et Infirmiers d'Urgence [ANIIU], 2004, p. 1).

Des études révèlent que les membres de la famille présents pendant la réanimation et les procédures invasives décrivent une meilleure adaptation à la perte de leur enfant (Howard, 2020, p. 113) ; ils témoignent d'un sentiment de confort en sachant que tout a été fait pour aider leur enfant (Dietrich, 2014, para. 13). Les parents se disent prêts à « … être à nouveau présents dans des circonstances similaires, ne changeraient pas leur expérience et recommanderaient à d'autres parents d'être présents » (Howard, 2020, p. 112). La documentation souligne également l'importance du dépistage des membres de la famille aptes à se rendre au chevet du patient. Dietrich (2014) et Oczkowski et coll. (2015) proposent de procéder à un dépistage des membres de la famille avant de les autoriser au chevet du patient ou dans la salle de réanimation. Les membres de la famille qui sont ou peuvent devenir extrêmement instables ou agressifs sur le plan émotionnel, par exemple, doivent être appuyés autrement.

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Registered Nurse (RN)/New Grad RN – Emergency Services (6 FT positions)

BC Children's Hospital
Vancouver

As per the current Public Health Order, full vaccination against COVID-19 is a condition of employment with PHSA as of October 26, 2021.

What you'll do

RNs are vital team members within the BC Children's Hospital (BCCH) Emergency Department (ED), and work together with a multidisciplinary team. Within the ED, the RN assumes responsibility and accountability for provision of the pediatric patients, including performing emergency care for resuscitation and stabilization, and pediatric trauma nursing care. The ED uses the philosophy of Family-Centred Care and serves pediatric and adolescent patients and their families. Usual duties of the role include:

- Perform primary and secondary nursing assessment, nursing diagnosis, planning, implementation and evaluation or real and potential health problems in patients
- Perform triage and prioritization of patients utilizing advanced pediatric assessment skills according to Canadian Pediatric Triage Assessment Scale (PCTAS).
- Maintain accurate, thorough and timely documentation in patient record of pertinent health information, nursing assessments, interventions, evaluations and communication.
- Provide patient and family education, discharge teaching and health promotion activities. Facilitate appropriate follow-up care in broader health community.

Virtual info session September 7 from 2-3pm! Learn more about what it's like working in BC Children's Emergency Department from current nursing and leadership team members.

Please RSVP in advance to Jean at Jean.Zhai@phsa.ca

What you bring

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- Graduation from an approved Nursing Program with current practicing registration as a Registered Nurse with the British Columbia College of Nurses & Midwives (BCCNM).
- Minimum of one (1) year's recent, related clinical experience in pediatrics or an Emergency Department setting.
- Emergency Nursing Pediatric course (ENPC)/Pediatric Advanced Life Support (PALS)/Trauma Nursing Core Course preferred (TNCC)
- Skills
- Communicate effectively, both verbally and in writing
- Relate effectively to children and their families
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