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Acceptability of the Venting Wisely pathway for use in critically ill adults with hypoxaemic respiratory failure and acute respiratory distress syndrome (ARDS): a qualitative study protocol

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ABSTRACT

Introduction Hypoxaemic respiratory failure (HRF) affects nearly 15% of critically ill adults admitted to an intensive care unit (ICU). An evidence-based, stakeholder-informed multidisciplinary care pathway (*Venting Wisely*) was created to standardise the diagnosis and management of patients with HRF and acute respiratory distress syndrome. Successful adherence to the pathway requires a coordinated team-based approach by the clinician team. The overall aim of this study is to describe the acceptability of the *Venting Wisely* pathway among critical care clinicians. Specifically, this will allow us to (1) better understand the user's experience with the intervention and (2) determine if the intervention was delivered as intended.

Methods and analysis This qualitative study will conduct focus groups with nurse practitioners, physicians, registered nurses and registered respiratory therapists from 17 Alberta ICUs. We will use template analysis to describe the acceptability of a multicomponent care pathway according to seven constructs of acceptability: (1) affective attitude;,(2) burden, (3) ethicality, (4) intervention coherence, (5) opportunity costs, (6) perceived effectiveness and (7) self-efficacy. This study will contribute to a better understanding of the acceptability of the *Venting Wisely* pathway. Identification of areas of poor acceptability will be used to refine the pathway and implementation strategies as ways to improve adherence to the pathway and promote its sustainability.

Ethics and dissemination The study was approved by the University of Calgary Conjoint Health Research Ethics Board. The results will be submitted for publication in a peer-reviewed journal and presented at a scientific conference.

Trial registration number ClinicalTrials.gov NCT04744298.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This qualitative study will provide vital information about why the implementation of the *Venting Wisely* pathway may or may not have worked as anticipated.
⇒ Findings will identify opportunities to improve pathway adherence and provide insights on how to sustain the intervention and scale to other sites.
⇒ Acceptance of and adherence to the *Venting Wisely* pathway have the potential to increase and standardise the use of evidence-informed, life-saving therapies for mechanically ventilated patients; this may improve outcomes and save costs to the healthcare system.
⇒ Focus groups will be conducted with a wide variety of clinicians (nurse practitioners, physicians, registered nurses and registered respiratory therapists) and within various intensive care units (general systems, cardiovascular surgery and neurosciences) and hospitals (regional, community and tertiary).
⇒ The study is being conducted in one province in Canada, which may limit generalisability.

INTRODUCTION

Acute hypoxaemic respiratory failure (HRF) is a common medical emergency affecting up to 15% of intensive care unit (ICU) admissions.[1 2] The most severe subtype of HRF is acute respiratory distress syndrome (ARDS).[3] ARDS is associated with significant mortality (over 30% in severe cases), functional disability and increased healthcare resource utilisation.[4–10] Guideline-recommended approaches for the application of mechanical ventilation and adjunctive therapies for HRF and ARDS exist.[11–15] Unfortunately, despite this, HRF and ARDS remain underdiagnosed, and evidence-based interventions remain underused.[10]

Effective clinical management of complex conditions such as HRF and ARDS requires a coordinated, multidisciplinary approach. The Institute of Medicine suggests using care

Figure 1 Five key steps of the *Venting Wisely* pathway.

pathways to coordinate and improve care of complex conditions.[16] We developed a care pathway for HRF and ARDS called *Venting Wisely* that is evidence informed, multidisciplinary and stakeholder derived.[17] This pathway standardises the diagnosis and management of HRF and ARDS. It includes 42 elements; however, it is focused on five key evidence-informed steps including measuring a patient's height to estimate the size of their lungs, screening for HRF daily, instituting lung protective ventilation consistently, using neuromuscular blockade and prone positioning when indicated (see figure 1).[17]

Acceptability of the intervention among clinicians is a crucial attribute for its success. Sekhon *et al* define acceptability as a multifaceted construct and propose the theoretical framework of acceptability (TFA) to evaluate the acceptability of healthcare interventions.[18] The TFA consists of seven components: (1) *affective attitude* (how a clinician feels about the intervention), (2) *burden* (the clinician's perception about the required amount of effort to participate in the intervention), (3) *ethicality* (the extent to which the intervention aligns with a clinician's value system), (4) *intervention coherence* (the extent to which the clinician understands the intervention), (5) *opportunity costs* (benefits or costs to the clinician for using the pathway), (6) *perceived effectiveness* (the extent to which the clinician perceives the intervention as likely to achieve its purpose) and (7) *self-efficacy* (the clinician's confidence that they can use the pathway).

Acceptability is recognised as an important implementation outcome that should be assessed in any complex intervention.[19] Therefore, understanding the acceptability of the *Venting Wisely* pathway is important to understand the user's experience of the intervention and whether the intervention is being provided as intended. Implementation of the *Venting Wisely* pathway is complex because it requires the engagement of multidisciplinary ICU care team members, including nurse practitioners, physicians, registered nurses or registered respiratory therapists. Our understanding of why the implementation of the *Venting Wisely* pathway does or does not work as anticipated will identify opportunities to improve pathway adherence and provide insights on how to sustain the intervention and scale to other sites.[18] Strong acceptability of the *Venting Wisely* pathway has the potential to increase and standardise the use of evidence-informed, life-saving therapies for HRF and ARDS, improve patient outcomes and reduce costs within the healthcare system. Study findings may also provide insights into how other complex interventions should and should not be implemented and adopted by multidisciplinary teams.

The *Venting Wisely* pathway is currently being implemented through a cluster randomised stepped wedge trial (ClinicalTrials.gov NCT04744298) across 17 adult ICUs in Alberta, Canada, as part of a hybrid implementation-effectiveness trial.[20] The analysis plan for this study has been previously published.[21] Prior to the implementation of *Venting Wisely* in 17 ICUs, we developed an implementation strategy to address identified barriers. This implementation strategy was standardised and consisted of eight key components: audit and feedback, education, training, clinical decision support, site champions, reminders, implementation support and empowerment.[21 22] It has been suggested that an assessment of acceptability be conducted prior to full implementation.[18] Acceptability of Venting Wisely was assessed in several ways prior to implementation. This included cocreation and validation of the pathway by stakeholders, assessment of barriers to pathway implementation, development of an implementation strategy to address barriers and a pilot study which included an acceptability assessment.[17 22 23]

Objective

The overall objective of this study is to explore clinician perceptions of the **acceptability** of the *Venting Wisely* pathway among ICU clinicians in a diversity of ICUs. These data will inform iterative refinements of the pathway and the implementation strategy for this pathway and suggestions for facilitating pathway fidelity, sustainability and scalability.

METHODS AND ANALYSIS

Study design

The study will be reported according to the Consolidated criteria for Reporting Qualitative research.[24] Following the implementation of the *Venting Wisely* pathway, we will conduct focus groups with critical care clinicians (nurse practitioners, physicians, registered nurses or registered respiratory therapists involved in using the pathway). The full study protocol has been published in a peer-reviewed journal.[21] This focus group protocol has been posted on a preprint server (medrxiv.org/content/10.1101/2023.04.21.23288685v1) prior to the completion of recruitment.[25] Focus groups were initiated in April 2022. The target for study completion is late 2023.

Participants and sampling frame

Participants will be eligible if they are a clinician (nurse practitioner, physician, registered nurse or registered respiratory therapist) working in 1 of the 17 ICUs in

Alberta, Canada, that has experienced the implementation of the *Venting Wisely* pathway for at least 2 months. Focus groups will be conducted during active implementation by our implementation team which will be approximately 6–18 months after initial implementation depending on the cluster randomisation timing of each site. All 17 ICUs will be included in focus groups. To ensure that focus group participants have adequate exposure to the pathway to comment on its acceptability, our goal is to conduct focus groups after ICUs demonstrate adherence to key pathway elements (ie, composite fidelity score of >70% or 10% gain above baseline). Any ICU that does not meet these criteria will have their focus group conducted at the end of the study regardless of their adherence to the pathway. The analysis of themes will take into consideration whether the sites were of high versus low adherence.

Eligible clinicians will be emailed a letter explaining the purpose of the study by the ICU manager or site pathway champions (online supplemental file 1). Interested clinicians will be invited to contact the research team. Participants will be emailed a $50 gift card after completion of the focus group in recognition of their time. Purposive sampling will be by discipline, that is, all participants in each focus group will be from the same discipline to ensure representation from clinicians across institutions and with diversity in the level of experience and primary discipline. All participants will be emailed a consent form (online supplemental file 2) and be asked to provide verbal informed consent before participating in the focus group (online supplemental file 3).

Data collection

We developed a focus group guide (online supplemental file 4) based on the seven constructs included in the TFA (table 1). We developed at least one question per domain, with prompts to probe domains for clarification or exploration. An ICU physician, registered nurses, registered respiratory therapists and researchers reviewed the focus group guide for face validity. The focus group guide will be pilot tested with four groups of specialty-specific stakeholders (ie, nurse practitioners, physicians, registered nurses and registered respiratory therapists) from the *Venting Wisely* pilot implementation site (Foothills Medical Centre, Calgary AB) to refine wording and enhance clarity prior to conducting interviews.

Focus groups will be moderated by a researcher (KDK) or knowledge translation expert/registered nurse (AI) with experience in qualitative methods. A researcher will observe the focus groups and take notes to record details of participants' surroundings, important features of participant responses and themes to consider in the formal data analysis. Focus groups will be conducted remotely using Zoom. The duration of focus groups will be scheduled for 1.5 hours. Demographic data will be collected via an online survey (Qualtrics, Provo, UT) prior to the start of the focus group, including age, gender identity, ethnic, racial or cultural self-identification, years of ICU experience, professional designation and primary hospital site (online supplemental file 5). All focus groups will be audio-recorded, transcribed verbatim, verified and deidentified. We will use Rev.com to transcribe the focus group interviews. Rev.com is an online transcription service that has been risk and compliance cleared by our institution. All focus group participants will be emailed a copy of the study report to review and comment on as a form of member checking.

Table 1 Theoretical framework of acceptability

Construct	Definition
Affective attitude	How a clinician feels about the intervention
Perceived effectiveness	The extent to which the intervention is perceived as likely to achieve its purpose
Self-efficacy	The clinician's confidence that they can perform the behaviour(s) required to participate in the intervention
Burden	The perceived amount of effort that is required to participate in the intervention
Intervention coherence	The extent to which the clinician understands the intervention and how it works
Opportunity costs	The extent to which benefits, profits or values must be given up to engage in the intervention
Ethicality	The extent to which the intervention has a good fit with a clinician's value system

The theoretical framework of acceptability proposes seven component constructs of acceptability.[18]

Sample size

There are no a priori sample size considerations. We plan to conduct up to 17 focus groups at least 2 months post-implementation of the *Venting Wisely* pathway (see above *Participants and sampling frame*). Each focus group will consist of representatives from four prespecified ICUs from a single discipline. We will limit focus groups to eight clinicians for a total of approximately 100 participants. We will conduct additional focus groups if needed to achieve theoretical saturation of themes (ie, point when new data do not generate any new insights).

Data analysis

Deidentified transcripts will be imported into NVivo-12 (QSR International, Melbourne, Australia) for data management and analysis. Each participant group (ie, nurse practitioner, physician, registered nurse or registered respiratory therapist) will be analysed independently to allow for the identification of discipline-specific themes. A coding template will be developed,

with a priori themes based on the seven constructs of the TFA. Qualitative data will be collected and analysed iteratively by two researchers (KDK and AI). The researchers, working independently, will begin by reading the transcripts to gain familiarity with the content, followed by line-by-line inductive coding with constant comparison. The researchers will meet after reviewing every 2–3 transcripts to review emerging findings; differences will be resolved through discussion. The codes will then be mapped to the template of a priori themes, and additional themes emerging through the analysis will be added. Subthemes will be identified within and across themes. Once all transcripts are coded and mapped, the data will be organised to describe how participant experiences are aligned with and divergent from the TFA constructs.[26–28] Quantitative demographic data will be summarised using descriptive statistics. The research team will meet regularly to review and discuss the findings. The multidisciplinary composition of the research team will ensure that the perspectives of all members of the ICU care team are reflected in the analysis and interpretation of data. Questions in the focus group guide may be adapted as focus groups are conducted and analysed in order to further explore identified subthemes.

Patient and public involvement

The study was designed with input from a patient partner. We do not plan to include patient or family representatives as part of the focus groups. This is for several reasons. First, they are not involved in either delivering or receiving the pathway. Second, they have not been educated on what the pathway is. Family involvement with the pathway is the topic of a separate study. A patient partner will be part of the final thematic interpretation once the initial analysis is complete.

Duration, challenges and mitigation

We anticipate focus group guide refinement, recruitment of participants, focus group meetings and analysis will take up to 24 months. The largest risk will be challenges in recruitment. Our team will leverage our multidisciplinary network of investigators and leaders to recruit clinicians as in previous studies completed successfully.[29 30]

Given the limited numbers of nurse practitioners that work in the critical care setting within Alberta, we may not have enough nurse practitioners to conduct site-based focus groups with just this group of practitioners. Instead, we may have to combine them with the physician group or combine nurse practitioners from multiple similar sites for a focus group. Future studies should endeavour to include as many critical care nurse practitioners as possible.

Focus groups may be conducted at variable durations after implementation of the pathway. This may introduce bias such as recall bias of acceptability or selection bias towards participants who work in the ICU. Focus groups will be conducted as quickly as possible within the 6–18-month timeframe to try and mitigate this bias.

Knowledge translation

We will use two types of knowledge translation throughout this study: integrated knowledge translation and end of grant knowledge translation.[31] Members of the ICU care team have been engaged throughout this study, from the development of the *Venting Wisely* pathway to the development and refinement of the focus group guide. During data analysis, we will present our findings to *Venting Wisely* clinical advisors to evaluate and iteratively improve implementation of the *Venting Wisely* pathway at other ICUs and improve pathway adherence.

ETHICS AND DISSEMINATION

Ethics

This study was approved by the University of Calgary Conjoint Health Research Ethics Board (REB20-0646).

Dissemination

We will compile a record of perceptions of the *Venting Wisely* pathway and how clinician involvement can be optimised and sustained. These will be included in a published report and inform future phases of this research programme, including an exploration of the sustainability and (inter)national scalability of the Venting Wisely pathway. Study results will be shared with the 17 ICUs who participated in this study, submitted to a peer-reviewed journal for consideration of publication and presented at a scientific conference. The results of the study will be disseminated to patients and the public at the completion of the trial.

Exploring clinician experiences with the *Venting Wisely* pathway will contribute to a better understanding of the user's experience of the *Venting Wisely* pathway. Study findings will be used to inform the refinement, implementation and sustainment of the pathway to ensure its use is as intended, which in turn may improve outcomes of critically ill adults with HRF and ARDS. Learnings about the acceptability of this intervention will lead to improved user satisfaction and also potentially improved adherence to the pathway and best clinical practice. Study findings may also provide insights into how guideline recommendations and other complex interventions for critical care-specific illnesses beyond HRF and ARDS should and should not be implemented and adopted by multidisciplinary teams within an ICU setting.

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first draft of the protocol and the manuscript. KKSP, KF, KDK, GK, HTS, DZ, SMB, ARdO, AI and JM contributed to editing and revisions. AI and JM were responsible for the acquisition of data and data analysis. KKSP takes full responsibility for the submission.

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