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Title: Early mobilisation of ventilated intensive care patients: A survey of critical care clinicians in an Australian tertiary hospital.

Abstract

Background: Mobilising mechanically ventilated patients is safe, beneficial, and improves outcomes. However, early mobilisation is not widely practiced and barriers to its implementation still exist.

Objective: To assess clinician perceptions, knowledge, attitudes, and behaviours towards mobilising critically ill ventilated intensive care patients, as well as perceived barriers and facilitators towards mobilisation.

Methods: A prospective questionnaire based on three existing questionnaires was administered to nurses, physicians and physiotherapists from a single mixed medical/surgical intensive care unit in an Australian tertiary hospital. The 32-item questionnaire focused on knowledge, attitudes, behaviour, and perceived facilitators and barriers. Various response options were used, and data were analysed using descriptive statistics.

Results: The overall response rate was 56.6% (82 of 145). Overall, clinicians' knowledge score was 4.1 (SD=1.4) out of a possible score of 6. Early mobilisation was not perceived as a top priority by 40.2% of participants. One important facilitator was that majority of the participants perceived early mobilisation was important. The most common perceived barriers to early mobilisation were medical

instability, delirium, sedation, and limited staffing. Clinicians' opinions varied on the timing and appropriateness for instituting early mobilisation.

Conclusions: Clinicians had various levels of knowledge on early mobilisation as a therapy for critically ill patients. Most clinicians believed that early mobility was important and willing to reduce sedation; however several key barriers were identified which need to be addressed by using targeted interventions. This will reduce or close the gap between knowledge and practice.

Key Words

Attitudes, Barriers, behaviour research, early mobilisation, Intensive care unit, knowledge translation, perception, questionnaire

1. Introduction

In many areas of health care gaps exist between research evidence on what should to be done and what actually happens in clinical practice.¹ The recognition of this knowledge to practice gap, together with a focus on quality improvement has seen an increase in evidence that supports the need to identify factors that help or hinder best evidence implementation in practice.²⁻⁴ This information can then be used to target implementation strategies used to improve patient care delivery.

Early mobilisation of mechanically ventilated patients has been found to be safe, feasible and associated with decreased patient length of ICU and hospital stay, and improved patient outcomes.⁵⁻¹¹ Despite this, current literature suggests that early mobilization is not widely practiced.¹⁰⁻¹³ This lack of translation into practice has gained much interest, with some suggesting the causes are multifactorial¹⁴ and differences are seen between countries, regions, and even between ICUs within the same hospital.¹⁴ A survey of current practice that included 951 ICUs from four countries identified significant variation in the delivery of early mobility within critical care.¹⁵ Importantly, common themes include setting explicit daily goals for patients, daily rounding, and addressing multiple barriers including staffing, competing priorities, and patient and caregiver safety in ICU with established early mobility practice.¹⁵

A focused review of 40 papers including clinical studies, quality improvement projects, and staff surveys identified 28 unique barriers to early mobilisation, including 14 patient related barriers, five ICU culture related barriers, five structural related barriers, and four process related barriers.¹⁶ The main barriers identified in their review were haemodynamic instability, limited staffing, early mobility not being perceived as a priority in patient care, and lack of inter-professional coordination.¹⁶ The authors concluded that while patient related barriers were most commonly cited, other important components such as systematic efforts to change ICU culture through multiple targeted strategies and an inter-professional approach are also required to successfully implement early mobility into clinical practice.^{16,17} A recent review of 12 quality improvement reports identified four key themes to successful implementation of early mobilisation programs within the ICU which included managing the change through strong leadership, designing strategies and interventions to

overcome barriers to implementation, multidisciplinary team collaboration, and the use of data collection and feedback systems.¹⁸ Similar results were reported in a 2018 interview study on barriers and facilitators in mobilising ventilated patients.¹⁷

Several theories and models exist to understand and guide change in clinician behaviour, and they have been used for implementation, and identification of barriers to change.^{19, 20} A recent systematic review identified that interventions tailored to address identified barriers are more likely to improve professional practice than in cases where barriers are not addressed or the dissemination of guidelines without considering contextual factors.² The need to identify specific barriers related to early mobilisation of ventilated patients, integrated with comprehensive approaches for designing implementation strategies may be effective in closing the gap from knowledge to practice. To our knowledge, to date, there has only been one single site study reporting barriers on ICU patients' mobilisation, in which the authors did not explore facilitators, nor knowledge, attitudes, or behaviours in their study.²¹

To gain a more comprehensive understanding of the knowledge practice gap to early mobilisation of ventilated patients in the Australian context, the aim of this study was to explore clinicians' perceptions, knowledge, attitudes, and behaviours towards early mobilisation of ventilated patients, and to identify perceived barriers and facilitators that influence the delivery of early mobilisation within an Australian regional tertiary ICU.

2. Methods

2.1 Design

A cross-sectional survey using a self-report paper-based questionnaire was conducted.

2.2 Ethical approval

Ethical approval was obtained from the Human Research Ethics Committees of the hospital (HREC/17/QPCH/293), and the University (2017/844).

Participation in the survey was anonymous and voluntary, with survey return indicating consent.

2.3 Setting and sample

Participants were recruited from an ICU of an Australian tertiary hospital, which was relocated to a newly built site on 28th March 2017. The unit staffing consisted of nurses, physicians and physiotherapists from the previous ICU site that subsequently closed on the same day. The ICU is a 12-bed closed unit, that is, ICU intensivists are responsible for all aspects of patient care including ICU admission, clinical management, and ICU discharge.²² It is a mixed medical/surgical unit where there is one-to-one nurse-patient ratio. Nurses, physicians and physiotherapists who have a role in patient mobilisation in the ICU were invited to participate in the survey. The inclusion criteria comprised registered nurses (both full and part time), medical officers of all levels, and physiotherapists who were employed to work in the ICU during data collection. At the time of the study 101 registered nurses, 37 medical officers, and 7 physiotherapists were eligible to take part.

2.4 Questionnaire construction

Two complementary conceptual frameworks guided the development of the questionnaire; the theoretical framework regarding barriers to knowledge use, the knowledge-attitudes-behaviour framework as described by Cabana et al.³ which was developed from a rigorous review of 76 articles on barriers to clinical practice guideline adherence; and the knowledge-to-action (KTA) framework as described by Graham et al.⁴ which is widely used and reported in clinical implementation studies. The principles of the knowledge-attitudes-behaviour framework are that, before clinical practice guidelines can affect patient outcomes, it must first affect clinician knowledge, then attitudes, and lastly behaviour.^{3,4} The KTA framework provides an overall model to promote the use of evidence into practice and identifies the need to understand the context and local barriers and facilitators. The knowledge-attitudes-behaviour framework then provides specific guidance on potential barriers and facilitators to consider. Thus, together, they guided our conceptualisation and measurement. Based on these frameworks, the questionnaire was designed to assess perceptions, knowledge, attitudes, and behaviours to early mobilisation, together with identifying the perceived barriers. The questionnaire instructions defined mobilisation as the ICU patient actively participating in sitting at the edge of the

bed, standing, and/or ambulating. The questionnaire collected additional data on clinician characteristics, including profession, years of clinical experience, and duration working in ICU.

The questionnaire consisted of 32-items, and five demographic questions which was modified from published questionnaires. Informed by the theoretical frameworks, we combined two separate surveys including the Physician questionnaire, and the Nursing and Physical Therapists questionnaire by Jolley et al. ²³. To be comprehensive, in addition we added one knowledge item (number 2) adapted from Castro, Turcinovic, Platz and Law ²⁴, one behaviour item (number 29), and two perception items (number 27 and 30) from Koo et al. ²⁵. The final questionnaire measures the following domains: clinician knowledge, attitude, behaviour, barrier, and perceptions of early mobility in ICU by using various forms of item formats (yes/no, Likert, nominal, and ordinal scales). There are no open-ended items. There were 12 barrier items (number 16-27) with responses ranged from 1 (not a barrier) to 4 (extreme barrier). (See supplementary table)

The six knowledge items (item 1-5, and 28) had 'correct' responses that formed a subscale to calculate the mean knowledge score of correct responses – a score of one was allotted to each correct answer with the range of total scores between zero and six. To assess content validity, the draft questionnaire was piloted by one expert from each discipline (nursing, medicine, and physiotherapy) to gather feedback on its content; including any missing content, flow and wording. The questionnaire was revised based on expert feedback and on consensus amongst the authors (see supplementary Table). The knowledge, attitude, perceptions, barriers' labels are for explanation purpose in the paper. They were not in the actual questionnaire sent to the participants.

2.5 Data collection

An e-mail was sent to potential participants via their work email account by the nursing unit manager, medical director and the head of the physiotherapy department inviting them to participate, with information regarding the study and where to access copies of the questionnaire together with information on the location of the collection boxes for their return. This, along with a project information leaflet that included an invitation to participate and the researcher's contact details, was displayed in the staff room and each of the unit's clinical areas. The participant questionnaire and

information sheet were also provided in the clinical areas as another option of information distribution of the study. After two weeks a reminder email was sent to the participants by departmental managers and a leaflet was put into the unit's communication book which staff frequently read.

2.6 Data analysis

Data were analysed using The Statistical Package for the Social Sciences (IBM Corp. SPSS version 25.0). Descriptive statistics were used to summarise the responses for all variables, including frequencies and percentages and medians (interquartile ranges IQR). The six knowledge items were formed into a knowledge score for each participant and the mean total knowledge score was calculated out of a maximum score of six. To calculate the incidence and severity of each barrier, the Likert scale response for the 12 barrier items was formed into a subscale to calculate the mean overall score to report the frequencies and proportions of the moderate to extreme barrier responses. Missed data were minimal; therefore, where responses were missing no imputations were performed and where more than one answer given for an item, which had a single response, the data was not used.

3. Results

During the data collection period 145 clinicians were eligible to complete the questionnaire. Overall 82 participants (56.6%) completed and returned the questionnaire. The response rates for nurses, physicians, and physiotherapists were 64.4% (65/101), 38.8% (14/37) and 42.9% (3/7) respectively. The median number of years of clinical experience was 15.0 years (IQR = 7-28; n=65), 7.5 years (IQR = 3-12; n=14), and 10.0 years (IQR n/a; n=3) and ICU experience 13.0 years (IQR = 4-20; n=65), 1.5 years (IQR = 1-7; n=14), 10.0 (IQR n/a; n=3) years for nurses, physicians and physiotherapists, respectively. The overall median ICU clinical experience was 16 years. In total, 55/82 (67.1%) of participants were female. Of the nurses, 49/65 (75.4%) were bedside nurses, 12/65 (18.5%) were senior team leaders, and the remaining 4/65 (6.1%) in nurse leadership roles. Of the physician group, 11/14 (78.6%) were registrars or their equivalent, while the remaining 3/14 (21.4%) were consultants.

3.1 Perceptions

Perceived importance of early mobilisation: Overall, a total of 65 out of 82 clinicians perceived early mobilisation as either crucial (n=7; 8.5%), very important (n=24; 29.3%), or important (n=34; 41.5%); with a small number of clinicians perceiving early mobilisation as somewhat important (n=16; 19.5%), or no great importance (n=1;1.2%) (Table 1).

Table 1: Perceived importance of early mobilisation and perceptions on when to initiate early mobilisation

Response option	Nurse n=65 n (%)	Physician n=14 n (%)	Physiotherapist n=3 n	All n=82 n (%)
Perceived importance of early mobilisation (only one response can be chosen)				
• Of no importance / of minimal importance	0 (0.0)	0 (0.0)	0	0 (0.0)
• Not of great importance, but clinicians should bear it in mind	1 (1.5)	0 (0.0)	0	1 (1.2)
• Somewhat important, should be considered in the care of ICU patients	12 (18.5)	4 (28.6)	0	16 (19.5)
• Important, should be a priority in the care of ICU patients	27 (41.5)	7 (50.0)	0	34 (41.5)
• Very important, should be a priority in the care of ICU patients	18 (27.7)	3 (21.4)	3	24 (29.3)
• Crucial, should be top priority in the care of ICU patients	7 (10.8)	0 (0.0)	0	7 (8.5)
Perceptions on when to initiate early mobilisation (More than one option could be chosen, thus the total in these questions do not add up to 100%)				
• As soon as the patient's cardio-respiratory status has stabilised (i.e. no escalation in haemodynamic or ventilatory support)	57 (87.7)	11 (78.6)	3	71 (86.6)
• As soon as the patient is conscious and can cooperate	57 (87.7)	9 (64.9)	1	67 (81.7)
• As soon as possible following ICU admission	36 (55.4)	7 (50.0)	3	46 (56.1)
• As soon as the patient is off all vasopressors and/or inotropic agents	38 (58.5)	4 (28.6)	1	43 (52.4)
• As soon as the patient is extubated	31 (47.7)	5 (35.7)	1	37(45.1)
• As soon as all sedative infusions are discontinued	25 (38.5)	2 (14.3)	0	27 (32.9)
• As soon as the patient is ready to be transferred out of the ICU	18 (27.7)	3 (21.4)	0	21 (25.6)

• Other, please specify	7 (10.8)	1 (7.1)	0	8 (9.8)
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Abbreviations: ICU: Intensive Care Unit

Percentage for Physiotherapists not provided as the total number is only 3.

Perceptions on when to initiate early mobilisation: Most participants (n=71; 86.6%) thought that early mobilisation should be initiated as soon as the patient's cardiorespiratory status has stabilised. Sixty-seven participants (81.7%) believed early mobilisation should be started as soon as the patient is conscious and cooperating, whereas 46 participants (56.1%) responded it should be started as soon as possible following ICU admission. Forty-three participants (52.4%) believe that when the patient was no longer requiring vasopressors and/or inotropic agents, extubated (n=37; 45.1%), with no sedative infusion (n=27; 32.9%), or when the patient was ready to be transferred out of ICU (n=21; 25.6%) was necessary to initiate mobilisation (see Table 1). As shown in Table 1, in this section of the survey, participants could choose multiple options. Thus, the results do not add up as 100% and the total is greater than the 82 respondents.

Perceived barriers to early mobilisation: Patient, provider and institutional barriers reported as moderate to extreme are displayed in Table 2. Delirium (n=70; 85.4%), medical instability (n=70; 85.4%), and over-sedation (57; 69.5%) were identified as the greatest barriers to early mobilisation. The most frequent provider-level barriers reported were nursing time (n=51; 62.2%), and timing of patient procedures (n=43; 52.4%). Early mobilisation is not perceived as a priority by 33 (40.2%) participants. Further provider-level barriers as perceived by participants (item 29) identified that overall 84.7% (n=50) of nurses, 93% (n=13) of physicians and all three physiotherapists perceived that the use of early mobilisation places staff at risk for musculoskeletal injury. Whereas 76.9% (n=45) of nurses and 71.4% (n=10) of physicians indicated that early mobilisation added to general work stress, furthermore 26.2% (n=17) of nurses and 42.9% (n=6) physicians perceived that early mobilisation contributed to prolonged workdays.

Table 2: Barriers to early mobilisation

<i>Factors assessed as moderate or extreme barriers</i>	Nurse n=65 n (%)	Physician n=14 n (%)	Physiotherapist n=3 n	All n=82 n (%)
Delirium	59 (90.8)	8 (57.1)	3	70 (85.4)
Medical instability	59 (90.8)	10 (71.4)	1	70 (85.4)
Over-sedation	48 (73.9)	6 (42.8)	3	57 (69.5)
Nursing time	40 (61.5)	10 (71.4)	1	51 (62.2)
Timing of patient procedures	37 (56.9)	3 (21.4)	3	43 (52.4)
Early mobilisation is not perceived as a priority	26 (40.6)	4 (28.6)	3	33 (40.2)
Physiotherapist availability	27 (41.5)	6(42.8)	0	33 (40.2)
Invasive lines in-situ (i.e. IAL,CVL, Vascath) *	29 (44.6)	2 (14.3)	1	32 (39.0)
Patient safety	39 (60.0)	4 (28.6)	1	28 (34.2)
Staff safety	22 (33.3)	5 (35.7)	1	28 (34.2)
Access to specialised equipment	21 (32.3)	4 (28.6)	1	26 (31.7)
Cost	6 (9.2)	1 (7.1)	1	8 (10.0)

Abbreviations: IAL: Intra-Arterial Line, CVL: Central Venous Line, Vascath: Venous Catheter
Percentage for Physiotherapists not provided as the total number is only 3.

3.2 Knowledge

Mean overall knowledge score of all participants was 4.1(SD=1.4) out of a possible 6 correct scores. The mean score of nurses was 4.1(SD=1.4), physicians 3.9 (SD=1.3), and physiotherapists 5.6 (SD=0.5). As shown in Table 3, overall 58.2% (46) of participants correctly identified the incidence of ICU-acquired weakness which is 40%. A total of 67.1% (55) participants correctly identified that range of motion is not sufficient to maintain muscle strength. Similar proportions of nurses (64.6%; 42), physicians (64.3%; 9), and two physiotherapists agreed that it is safe to mobilise an intubated mechanically ventilated patient out of bed, while less nurses (47.6%; 30) agreed to mobilise a mechanically ventilated patient on vasopressors and/or inotropes out of bed than the other professional groups. Fifty-four (83.1%) nurses, 11 (78.6%) physicians, and all three physiotherapists correctly identified that early mobilisation of mechanically ventilated patients reduces the duration of mechanical ventilation, with similar response rates to length of ICU stay (Table 3).

Table 3: Knowledge: correct answer within clinician groups

Item	Nurse n=65 n (%)	Physician n=14 n (%)	Physiotherapist n=3 N	All n=82 n (%)
Please choose the correct answer:				
What do you think is the approximate incidence of ICU-acquired weakness in the population of ICU				
<5%	0 (0.0)	0 (0.0)	#	0 (0.0)
5-10%	0 (0.0)	1 (7.1)	#	1 (1.2)
11-20%	5 (7.7)	1 (7.1)	#	6 (7.6)
21-40%	12 (18.5)	7 (50.0)	#	19 (24.1)
>40% *	42 (64.6)	4 (28.6)	#	46 (58.2)
Don't know	6 (9.2)	1 (7.1)	#	7 (8.9)
Total	65(100)	14(100)	3	79(100)
<i>Agree/strongly agree responses</i>				
Range of motion exercise (active or passive) is sufficient to maintain muscle strength in critically ill patients.	42 (64.6)	10 (71.4)	3	55 (67.1)
It is safe to mobilise intubated patients who are mechanically ventilated out of bed.	42 (64.6)	9 (64.3)	2	53 (65.4)
It is possible to mobilise a patient receiving mechanical ventilation on a low dose of vasopressors and/or inotropic agents.	30 (46.2)	10 (71.4)	3	43 (52.4)
Early mobilisation of mechanically ventilated patients reduces duration of mechanical ventilation.	54 (83.1)	11 (78.6)	3	68 (82.9)
Early mobilisation of intubated and mechanically ventilated patients decreases length of ICU stay.	57 (87.7)	11 (78.6)	3	71 (86.6)

*Correct answer;

missing data. Percentage for Physiotherapists not provided as the total number is only 3.

3.3 Attitudes

Overall, as shown in Table 4, for item 1 and 2, only 19 (29.2%) nurses, 2 (14.3%) physicians, and two physiotherapists identified that nurse staffing was adequate to mobilise patients and 30 (46.9%) nurses and 3 (21.4%) physicians identified physiotherapy staffing was adequate. Irrespective of adequate staffing levels, for item 3, 61.5% (40) of nurses, and two physiotherapists perceived that they had enough time to help mobilise a patient receiving mechanical ventilation once per day, whereas only 35.7% (5) of the physicians perceived that they, themselves had enough time to mobilise

patients. For item 4, most nurses (n=59; 92%) and physicians (n=13; 92.9%), and all physiotherapists answered that they would agree to mobilise a mechanically ventilated patient, however only 43.1% (28) of nurses, and 64.3% (9) of physicians agreed they would mobilise a mechanically ventilated patient on vasopressors and/or inotropes (item 5). Forty-one (63.1%) nurses, 10 (71.4%) physicians, and all physiotherapists indicated that mobilisation should occur automatically via a nursing and physiotherapy protocol unless the physician specifically orders otherwise (item 6). While more than half of nurses (n=33; 50.8%) and physicians (n=10; 71.4%), and all physiotherapists disagreed that the risks to staff outweighs the benefits to early mobilisation, only 43.1% (28) of nurses disagreed that the risks to patients outweighs the benefits (see Table 4).

Insert Table 4 about here.

3.4 Behaviours

Overall, 53 (81.5%) nurses, 12 (85.7%) physicians, and all three physiotherapists agreed that they would be willing to decrease sedation, while most nurses (49; 75.4%) and physicians (12; 85.7%), and all three physiotherapists agree that within the scope of their practice they would alter the mechanical ventilation settings to facilitate mobilisation.

4. Discussion

The questionnaire results of ICU clinicians revealed the following key findings. Different clinician groups had various levels of knowledge on early mobilisation, and held different opinions on when to initiate mobilisation. Facilitators included that a majority of clinicians perceived early mobilisation to be important for critically ill patients and they were willing to reduce sedation when required. However, there were patient, clinician and organisational barriers to be addressed when implementing early mobilisation in this unit.

We found that the factors influencing early mobilisation in ICU are complex, which requires specifically targeted interventions to overcome the barriers and promote the facilitators. Overall, not only different clinician groups had various levels of knowledge on early mobilisation as a therapy for

critically ill patients, they also had varying opinions on the timing and appropriateness for instituting early mobilisation. While many clinicians believed early mobilisation should occur as soon as possible after admission to ICU, most seem to be primarily influenced by safety concerns and severity of illness, which is consistent with findings from existing literature,¹⁶ despite current research evidence suggests that early mobilisation is safe.¹¹ This calls for targeted interventions to improve multidisciplinary team work to ensure a shared understanding of safe and early mobilisation.

Our data suggests that clinicians were most likely to restrict early mobility depending on the amount of cardiovascular support and the level of consciousness or the ability of the patient to cooperate. As the latter is a determinant for instituting early mobilisation, delirium and the use of sedatives were also identified as extreme barriers to early mobilisation in our study. While severity of illness is the main risk factor to delirium in ICU,²⁶ over-sedation is another important modifiable risk factor to delirium.²⁷ Furthermore, over-sedation is consistently reported as one of the most frequent barriers to early mobilisation. Previous mobility studies have been successful in changing patient sedation protocols by adopting goal-directed practices to reduce sedation to facilitate patient participation and mobilisation.²⁸⁻³⁰ Also, the addition of a valid and reliable ICU delirium screening tool added to existing nursing assessments of pain and sedation facilitates delirium identification, prevention, and treatment.^{29, 31} One facilitator we found in this study was that all clinician groups were willing to reduce sedation for early mobilisation. This facilitator will contribute to change of practice in reducing sedation use and better uptake of early mobilisation.

Clinicians in our study also believed that the use of vasoactive drugs restricts permissible level of patient mobility. This may indicate that clinicians are unaware of the evidence that exists demonstrating that patients receiving a stable dose of vasoactive drugs can be safely mobilised with few adverse events.^{9, 32, 33} Specific protocols and targeted education on appropriate patient selection on a case-by-case basis may address this barrier,^{16, 34} and increase clinician acceptance of early mobilisation in this group of patients.

In our study, majority of the clinicians, who were experienced ICU staff (median time in ICU was 16 years), believed that early mobility was important or very important in mechanically ventilated patients, but they did not perceive early mobility as their top priority in patient care. This might be a barrier related to the process of mobilisation and a reluctance among clinicians to initiate early mobilisation. This may be due to role ambiguity, whereby clinician groups may not believe they have primary responsibility for ensuring that a patient progresses to mobility as soon as is possible. The use of protocols such as the pain, agitation, and delirium (PAD) Guidelines incorporated in the ABCDEF bundle³⁵ and the use of systems into workflow such as checklists and removing bed rest options can provide a standardised interprofessional team approach to patient care.¹⁸ Although it was not assessed who was believed to be the first to identify when a patient was ready for early mobility, nursing time was perceived to be an extreme provider barrier. When a team approach is taken, there is the potential that nursing time will be less of a barrier as all team members assume responsibility.

Consistent with previous studies,^{23, 25, 36} barriers around the lack of time, personnel and resources necessary to mobilise mechanically ventilated patients were reported in our study. To address the issues of competing priorities, it is important, as stated above, that the multidisciplinary team work collaboratively rather than a single discipline when mobilising patients.³⁷ Multidisciplinary team collaboration was identified as an essential element in successful quality improvement projects and required efficient and timely interdisciplinary communication and collaboration.¹⁸ Importantly, adequate staffing levels are crucial to support safe patient mobilisation. Realigning existing staffing models or hiring of new staff to support early mobilisation may be necessary.¹⁸

Further, provider barriers were highlighted by clinicians which provide critical insights on factors that may pose a challenge to implementing early mobilisation. The risk of musculoskeletal injuries to clinicians, added general work stress, increased workload, and general safety concerns for the staff and patient were identified. By identifying these perceived barriers among clinicians, targeted interventions, such as education and training, could be designed and implemented to increase clinicians' confidence, competence, acceptance, and participation in safely mobilising patients.

To bring about change in clinician behaviour, an integrative review on early mobilisation quality improvement projects identified that utilisation of multifaceted tailored strategies that corresponded with the evidenced-based interventions as described by Cochrane Effective Practice and Organisation of Care (EPOC)³⁸ was fundamental to success.¹⁸ While the provision of education was a component in these projects to increase knowledge, other interventions were utilised such as multidisciplinary staff meetings to encourage teamwork, and reinforcement from key leaders and unit champions were used to bring about change.¹⁸ To move beyond knowledge and education acquisition and to generate practice change, the KTA framework can guide the development, implementation, and evaluation of a targeted intervention on ICU patients' early mobilisation.

The modified questionnaire we developed in this study, under the guidance of two complementary frameworks enabled a clear and comprehensive understanding of the barriers and facilitators in ICU patient mobilisation in this Australian ICU. It adds to the previous study conducted by Dafoe et al.²¹ which limited its exploration to the barriers to mobilising ICU patients.

5. Limitations

There were some limitations to this study. First, the sampling was from a single institution, limiting the generalisability of our findings. However, the insights provided by this study may inform others who are wanting to promote early mobilisation. Second, the data were collected using a self-reported questionnaire. When self-reported studies are used, respondents may over or under report their level of knowledge and attitudes to meet a socially acceptable behaviour.³⁹ Finally, even with pilot testing, and item refinement, some survey items may have ambiguity. Reliability and validity testing of the questionnaire with larger samples is recommended.

6. Conclusions

Our study, which to our knowledge, is the first study underpinned by a theoretical framework and measures clinicians' knowledge, attitudes, behaviours, and both barriers and facilitators conducted in

the Australian context. It provided initial insight into the perceptions, knowledge, attitudes, and behaviours of clinicians in early mobilisation of ventilated ICU patients. It revealed that overall clinicians' knowledge of early mobilisation of critically ill patients could be improved. Facilitators included most clinicians believing early mobilisation as important and were willing to reduce sedation when needed. However, several key patient, provider, and institutional level barriers to implementation were identified. Barriers such as insufficient staffing levels and time for complex mobilisation procedures, patients' severity of illness, the presence of delirium, excessive sedation, and the use of vasoactive drugs may challenge timely early mobilisation in ventilated patients.

Our results provide a greater understanding of the modifiable barriers that clinicians in our ICU may face when facilitating early mobility in critically ill patients, highlighting some of the factors contributing to the gap between knowledge and practice. The specific barriers identified can be addressed by using targeted interdisciplinary interventions to implement early mobilisation as a standard of care, with the aim to reduce or close the gap between knowledge and practice. Further research is required to evaluate the effectiveness of these targeted interventions.

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