

BMJ Open Quality Effects of social influence and implementation climate and leadership on nurse-led early mobility behaviours in critical care

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ABSTRACT

Introduction Early mobility (EM), initiating and advancing physical activity in the earliest days of critical illness, has been described as the most difficult component of the ABCDEF bundle to implement and coordinate. Successful implementation of EM in clinical practice requires multiple targeted implementation strategies.

Objective Describe the associations of nurses' EM attitudes, subjective norms, perceived behavioural control, intention, and implementation climate and leadership with self-reported and documented EM behaviour in the intensive care unit (ICU).

Design This was a two-site, descriptive, cross-sectional study to explore nurses' perception of the factors influencing EM adherence.

Setting Three ICUs (medical, surgical and cardiovascular) in an academic medical centre and two ICUs (medical/surgical and cardiovascular) in a regional medical centre in middle Tennessee.

Patients Critically ill adults.

Interventions None.

Main outcome measures A 34-item investigator-developed survey, Implementation Leadership Scale, and Implementation Climate Scale were administered to ICU nurses. Survey development was informed by a Theory of Planned Behavior based elicitation study and implementation science frameworks.

Results The academic medical centre had markedly lower EM documentation. We found no difference in nurses' EM attitudinal beliefs, social influence, facilitators, and barriers at both sites. Nurses perceived moderate social influence to perform EM similarly across sites and considerable control over their ability to perform EM. We did note site differences for implementation climate and leadership and objective EM adherence with the regional community medical centre demonstrating statistically significant relationships of implementation climate and leadership with self-report and documented EM behaviours.

Conclusions We identified contextual differences in implementation climate and leadership influence when comparing nurse EM behaviours. Streamlined documentation, leadership advocacy for interprofessional coordination and manpower support, and multicomponent context-based implementation strategies could contribute to better EM adherence.

WHAT IS ALREADY KNOWN ON THIS TOPIC?

⇒ Early mobility (EM) is an essential evidence-based critical care intervention, but it remains underused in clinical practice. Multifactorial barriers influence implementation and coordination of EM.

WHAT THIS STUDY ADDS?

⇒ Contextual differences in implementation climate and leadership play a significant role in both subjective and objective measures of EM adherence.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY?

⇒ Future research, practice and policy efforts should consider contextual differences when determining appropriate implementation strategies to facilitate EM adherence.

INTRODUCTION

Early mobility (EM) is an essential component of the ABCDEF bundle, a multicomponent, evidence-based set of intensive care unit (ICU) care activities (Assess, prevent, and manage pain; Both spontaneous awakening and breathing trials; Choice of sedation; Delirium: assess, prevent and manage; Early mobility; Family engagement and empowerment). Implementation of EM is associated with decreased delirium, ventilator, ICU, and hospital days; less benzodiazepine use; improved functional independence prior to hospital discharge; and reduced hospitalisation costs.^{1–5} However, implementation is challenging, and reports indicate early mobilisation and mobility scales remain underused around the globe.⁶

EM, initiating and advancing physical activity in the earliest days of critical illness, has been described as the most difficult component of the ABCDEF bundle to implement and coordinate.⁷ There are a myriad of barriers affecting implementation and coordination of EM. These barriers can be



categorised as patient-level (eg, severity of illness and delirium), structural (eg, staffing, equipment and guidelines), cultural (eg, leadership support and knowledge), and process-oriented (eg, coordination, unclear expectations and standing bedrest orders) factors.⁸ To overcome these multifactorial barriers, successful implementation of EM in clinical practice requires multiple targeted strategies.

Using the Theory of Planned Behavior (TPB), a previously conducted EM elicitation study identified nurses' salient EM attitudinal, subjective norm and control beliefs.⁹ Descriptions of the role of nurse-specific EM beliefs, intention, and actual behaviour within the context of a specific implementation environment can further identify targeted implementation strategies to improve uptake and adherence. Accordingly, the objective of this study was to describe the associations of nurses' EM attitudes, subjective norms, perceived behavioural control, intention, and implementation climate and leadership with self-reported and actual EM behaviour.

METHODS

We conducted a cross-sectional descriptive study from February 2020 to August 2020 using quantitative survey methods to capture nurses' perceived EM beliefs, subjective norms, control factors, intentions, and self-reported EM behaviours with their respective EM documentation.

Theoretical framework

Overt choice behaviours can be described, explained, and predicted by applying the TPB.¹⁰ The TPB theorises that behavioural attitudes (ie, disposition toward a behaviour), subjective norms (ie, social pressure), and perceived control (ie, ability to perform behaviour) influence intention and thus performance.⁹ Using the TPB as a framework, we propose that ICU nurses' perceived EM beliefs, subjective norms, and control factors contribute to EM intentions and actual EM behaviour and that organisational factors (eg, implementation climate and leadership) moderate EM intentions and behaviours.

Setting and sample

This study was conducted in one regional community medical centre (site A) with 250 adult beds and one tertiary academic medical centre (site B) with >800 adult beds located in middle Tennessee. We enrolled nurses in two cardiovascular ICUs, one medical ICU, one surgical ICU, and one mixed medical/surgical ICU. The participating ICUs designate EM as a nurse-led activity with formalised EM protocols in place that define screening and eligibility criteria, progressive mobility levels, and stopping criteria with physical and occupational therapy engagement only by consultation. Both sites implemented EM as part of the ABCDEF bundle. Patient acuity and nurse-to-patient ratios (ie, 1:2) are also equivalent. We used convenience non-probability sampling to recruit 20 nurses per ICU (target sample of 100 nurses total). Full-time or part-time registered nurses (≥4 shifts/month) providing care to

patients within study ICUs at their respective institution for at least 6 months were eligible to participate. Nurses were excluded if they were travelling, float pool, or a new graduate (ie, <1 year in nursing).

Variables and measures

A standard TPB questionnaire uses direct measures of attitudes, subjective norms, perceptions of behavioural control, intentions, and behaviour informed through elicitation. The Evidence-Based Practice Opinion Survey was developed based on EM salient belief data collected from an elicitation study conducted by the authors.^{9 11} The qualitative elicitation study identified EM team members' most salient EM beliefs, subjective norms and control factors and served as the framework for constructing the investigator developed 34-item TPB instrument consisting of 23 EM perception items and 11 demographic items (see online supplemental content for full TPB instrument). TPB item responses were on a 7-point Likert-type rating scale (eg, extremely disagree=1, extremely agree=7). Feasibility testing demonstrated a 5–7 min completion time. Pilot testing revealed minimal non-response potential for individual items.

Organisational factors related to the implementation environment were measured by the Implementation Climate Scale (ICS; 18 items and 6 subscales) and Implementation Leadership Scale (ILS; 12 items and 4 subscales).^{12 13} The ICS is a measure that captures six dimensions of the organisational context indicating the extent to which an organisation prioritises and values the successful implementation of evidence-based practice (EBP). The ILS measures unit level leadership for EBP implementation by evaluating proactive, knowledgeable, supportive, and perseverant leadership. Both ICS and ILS item responses were on a 5-point Likert rating scale (ie, completely disagree=1, completely agree=5). Both scales have demonstrated convergent and discriminant validity.^{12 13} The reliability of the scores generated in this study were very good (Cronbach's α , ICS scores>0.85 and ILS scores>0.92).

Typically, TPB studies measure observed overt behaviours. However, EM may be performed only 1–2 times per shift, if performed at all. It was not feasible for our small study team to perform an observational measurement of EM behaviours on multiple 12-hour shifts. Thus, EM behaviour was measured via electronic health record (EHR) nurse documentation of their respective EM performance during a 12-hour shift. In one study, the EHR documentation estimated ambulation, sitting out of bed, and turning events with excellent agreement, while underestimating standing, transferring, and pre-gait activities.¹⁴ The sites used different EHR systems and had different EM documentation formats. Objective EM behaviour was defined as documentation of any EM level or failed safety screen for a patient cared for by the nurse study participant within the previous 10 shifts.

Procedures

After obtaining institutional review board (IRB) and unit manager approval from each institution, the investigators (LMB and SEP) presented the study to unit staff using the following strategies, based on preference of unit leadership and investigator availability: (a) 1:1 interaction with ICU nurses during study rounds or (b) recruitment email with survey link distributed by nursing leadership. During 1:1 interaction, investigators explained participant eligibility and the study purpose, procedure, and consent process. Both IRBs granted a waiver of documentation of informed consent to preserve participant anonymity; thus, survey participation equated informed consent. To ensure participant confidentiality, investigators remained in the ICU to collect completed paper instruments, which were returned within 20 minutes of distribution. Study personnel then obtained the list of patients assigned to each nurse participant in the 10 shifts worked prior to the date of survey completion for EHR EM behaviour data collection. EM safety screening, level of mobility completed, reasons for not mobilising, or missing documentation were extracted by trained study personnel familiar with each site's EHR EM documentation standards and location in the flowsheet. Study data were managed using REDCap electronic data capture tools hosted by Vanderbilt University.¹⁵

Patient and public involvement

Patients or the public were not involved in the design, conduct, reporting or dissemination plans of our research.

Statistical methods

Statistical summaries of the nurse characteristics, survey scores (TPB, ICS and ILS), and documented adherence values were generated for each site and compared using χ^2 tests (nominal/ordinal variables) or Mann-Whitney tests (continuous variables). Wilcoxon signed-rank tests were used to test for within-group differences (eg, ICS vs ILS scores). Spearman's r_s coefficients were used to assess the strength and direction of the associations of the TPB, ICS, and ILS scores with self-reported and objective EM adherence values. An α of 0.05 was used for determinations of statistical significance.

RESULTS

Summaries of demographic and work characteristics for $n=86$ participants are presented in [table 1](#). We were unable to recruit to our target sample of $n=100$ due to nurse competing demands, nurse stress from caring for patients with COVID-19, and requests from nursing leadership to stop recruitment. There were no statistically significant demographic nurse differences between the sites. Participants were predominantly female (84%),

Table 1 Nurse demographic characteristics by site

Variables	Overall N=86	Site A: regional medical centre, n=42	Site B: academic medical centre, n=44	p value
Female, n (%)	72 (84)	34 (81)	38 (86)	0.50
Age in years, median (IQR)*	28 (25, 36)	31 (26, 38)	27 (24, 34)	0.08
Race, n (%)†				0.61
White	82 (97)	41 (98)	41 (95)	
Black	1 (1)	0 (0)	1 (2)	
American Indian	2 (2)	1 (2)	1 (2)	
Hispanic, n (%)	0 (0)	0 (0)	0 (0)	–
Highest degree, n (%)				0.63
Associate	7 (8)	4 (10)	3 (7)	
Bachelor's	68 (79)	34 (81)	34 (77)	
Master's	11 (13)	4 (10)	7 (16)	
Years in nursing, median (IQR)	4 (3, 10)	5 (3, 12)	4 (2, 9)	0.36
Years at current institution, median (IQR)‡	3 (2, 7)	4 (2, 8)	3 (2, 6)	0.30
Years at current unit, median (IQR)‡	3 (1, 5)	3 (1, 6)	2 (1, 4)	0.07
Day shift (07:00–19:00), n (%)	63 (73)	27 (64)	36 (82)	0.07
Hours worked per week, median (IQR)	36 (36, 36)	36 (36, 36)	36 (36, 36)	0.11

*N=84; site A: n=40.
†N=85; site B: n=43.
‡N=85; site B: n=43.

Table 2 Theory of Planned Behaviour, Implementation Climate, and Implementation Leadership scores by site

Variable	Possible Range	Overall median (IQR), N=86	Site A: regional medical centre, median (IQR), n=42	Site B: academic medical centre, median (IQR), n=44	p value
Theory of Planned Behaviour domains					
Attitudes*	4–154	115.0 (104.0, 127.0)	118.0 (104.0, 128.0)	114.0 (103.0, 121.0)	0.49
Subjective norms†	4–112	54.5 (39.2, 67.0)	52.0 (31.7, 67.0)	56.0 (43.5, 68.5)	0.19
Control‡	4–28	22.0 (21.0, 25.0)	22.0 (21.0, 24.3)	23.0 (21.0, 25.0)	0.50
EM intention	1–7	6.7 (5.6, 7.0)	6.3 (5.6, 7.0)	6.7 (6.0, 7.0)	0.21
EM behaviour					
Self-report	0–100	80.0 (60.0, 90.0)	80.0 (60.0, 90.0)	80.0 (70.0, 90.0)	0.70
EHR documentation	0–100	36.9 (0.0, 92.5)	92.6 (84.5, 100.0)	0.0 (0.0, 13.3)	<0.001
Implementation Climate Scale					
Overall‡	0–4	2.7 (2.1, 3.2)	2.7 (2.0, 3.1)	2.8 (2.1, 3.2)	0.40
Focus on EBP		3.7 (3.0, 4.0)	3.3 (3.0, 4.0)	4.0 (3.3, 4.0)	0.009
Educational support*		3.3 (2.6, 4.0)	3.5 (2.6, 4.0)	3.0 (2.3, 3.7)	0.16
Recognition for EBP§		3.3 (2.6, 4.0)	3.0 (2.5, 3.7)	3.7 (2.6, 4.0)	0.03
Rewards for EBP*		0.7 (0.0, 1.7)	0.8 (0.0, 2.0)	0.3 (0.0, 1.0)	0.25
Selection for EBP*		2.3 (1.1, 3.0)	2.3 (0.6, 3.0)	2.7 (1.3, 3.0)	0.18
Selection for openness*		3.0 (3.0, 4.0)	3.0 (2.2, 3.2)	3.0 (3.0, 4.0)	0.02
Implementation Leadership Scale					
Overall¶	0–4	3.6 (2.8, 4.0)	3.2 (2.7, 3.8)	3.8 (3.1, 4.0)	0.007
Proactive*		3.0 (2.3, 4.0)	3.0 (2.0, 3.5)	3.3 (2.6, 4.0)	0.01
Knowledgeable*		4.0 (3.0, 4.0)	3.2 (3.0, 4.0)	4.0 (3.6, 4.0)	0.007
Supportive¶		3.7 (3.0, 4.0)	3.0 (3.0, 4.0)	4.0 (3.0, 4.0)	0.01
Perseverant*		3.7 (3.0, 4.0)	3.0 (2.3, 4.0)	4.0 (3.0, 4.0)	0.01
*N=85; Site B: n=43. †N=84; site B: n=42. ‡N=83; site A: n=41 and site B: n=42. §N=85; site A: n=41. ¶N=82; site A: n=41 and site B: n=41.					

white (97%), bachelor's educated (79%), employed full time, day shift (73%), and young (median age=28 years).

Self-report and objective measures of EM adherence

Overall, median nurse self-reported EM adherence was 80% (IQR=70%, 90%) and similar for both sites ($p=0.70$). To the contrary, as given in table 2, the objective measure of nursing shift EM adherence via EHR documentation was very different between the two sites. Median objective documentation was 96% (IQR=84%, 100%) for site A, yet for site B that respective median value was 0% (IQR=0%, 14%; $p<0.001$), suggesting poor documentation and/or objective EM adherence. The overall correlation of self-reported EM adherence with the objective EHR documentation values was 0.03 ($p=0.81$). There was a non-significant positive association between self-reported and objective EM adherence within the sample of nurses at site A and a significant inverse correlation observed within site B ($r_s=0.23$, $p=0.14$ and $r_s=-0.32$, $p=0.03$, respectively).

Site summaries of TPB, implementation climate, and implementation leadership

Nurses' EM attitudes, subjective norms, perceived behavioural control, intention, and implementation climate and leadership are summarised by site in table 2. Individual attitudes toward the benefits (eg, decrease risk of complications) and disadvantages (eg, fall and device removal) of EM were similar for both sites ($p=0.49$). Nurses perceived moderate social influence to perform EM, which was similar across sites (median overall=54.5; site A=52.0; site B=56.0; $p=0.19$). Nurses also perceived considerable control over their ability to perform EM (eg, staffing, equipment, time) (possible range=4–28; overall median=22; $p=0.50$). Overall and between sites, nurses reported highly likely intentions to perform EM. In general, perceptions of implementation leadership were higher than those of implementation climate with a median score of 3.6 (IQR=2.8, 4.0) and 2.7 (IQR=2.1,

Table 3 Correlations of TPB, implementation climate and leadership scores with self-reported and objective EM documentation by site

Variable	Overall N=86		Site A: regional medical centre, median (IQR), n=42		Site B: academic medical centre median (IQR), n=44	
	Self	Objective	Self	Objective	Self	Objective
Theory of Planned Behaviour domains						
EM intention	0.45 (<0.001)	-0.13 (0.23)	0.64 (<0.001)	0.15 (0.33)	0.19 (0.23)	-0.17 (0.28)
Attitudes*	-0.09 (0.44)	0.04 (0.69)	-0.20 (0.21)	-0.06 (0.70)	0.04 (0.80)	-0.06 (0.73)
Subjective norms†	0.13 (0.23)	-0.05 (0.65)	0.27 (0.09)	0.33 (0.04)	-0.10 (0.54)	-0.04 (0.80)
Control‡	0.05 (0.63)	-0.09 (0.41)	-0.17 (0.27)	-0.09 (0.58)	0.33 (0.03)	-0.04 (0.81)
Implementation Climate Scale						
Overall‡	0.16 (0.16)	-0.09 (0.44)	0.28 (0.07)	0.06 (0.72)	0.01 (0.96)	-0.07 (0.67)
Focus for EBP	0.22 (0.04)	-0.22 (0.04)	0.34 (0.03)	0.09 (0.58)	0.11 (0.47)	0.04 (0.80)
Educational support*	0.21 (0.05)	0.15 (0.17)	0.22 (0.15)	0.06 (0.70)	0.20 (0.19)	0.01 (0.97)
Recognition for EBP§	0.22 (0.05)	-0.22 (0.04)	0.38 (0.01)	-0.06 (0.72)	0.09 (0.55)	0.06 (0.69)
Rewards for EBP*	0.01 (0.92)	0.12 (0.27)	0.11 (0.51)	0.04 (0.80)	-0.17 (0.27)	-0.03 (0.87)
Selection for EBP*	0.01 (0.91)	-0.16 (0.14)	0.01 (0.98)	0.05 (0.74)	0.03 (0.84)	-0.18 (0.25)
Selection for openness*	0.24 (0.03)	-0.16 (0.14)	0.51 (<0.001)	0.23 (0.15)	-0.04 (0.82)	0.04 (0.81)
Implementation Leadership Scale						
Overall ¶	0.10 (0.35)	-0.19 (0.09)	0.23 (0.15)	0.37 (0.02)	0.01 (0.99)	0.01 (0.99)
Proactive*	0.17 (0.13)	-0.17 (0.13)	0.29 (0.06)	0.30 (0.06)	0.08 (0.61)	0.01 (0.99)
Knowledgeable*	0.10 (0.35)	-0.18 (0.10)	0.21 (0.18)	0.29 (0.07)	-0.01 (0.94)	0.07 (0.68)
Supportive ¶	0.07 (0.53)	-0.16 (0.15)	0.16 (0.32)	0.35 (0.03)	0.03 (0.87)	0.01 (0.96)
Perseverant*	0.15 (0.18)	-0.14 (0.22)	0.32 (0.04)	0.47 (0.002)	-0.04 (0.79)	-0.02 (0.91)

*N=85; site B: n=43.
 †N=84; site B: n=42.
 ‡N=83; site A: n=41 and site B: n=42.
 §N=85; site A: n=41.
 ¶N=82; site A: n=41 and site B: n=41.

3.2; $p < 0.001$), respectively. Site B nurses perceived significantly better implementation climate and leadership as compared with site A in climate subscales for focus ($p = 0.009$), recognition ($p = 0.03$), selection for openness ($p = 0.02$), and all leadership subscales ($p < 0.01$).

Associations of TPB, implementation climate, and implementation leadership with EM behaviour

Correlations of the TPB construct scores, as well as the ICS and ILS scores, with both self-reported and objective medical record documentation of EM behaviours are given in table 3. Given the different patterns of EM self-reported and objective documentation observed between the sites, correlations were also generated within each site. As shown, where statistically significant overall correlations were observed, most were due to the respective correlation within site A, not site B. For example, there was a statistically significant correlation of overall TPB intention and self-report EM behaviour ($r_s = 0.45$, $p < 0.001$); but, within sites, only site A demonstrated a significant correlation of EM intention and self-reported behaviour ($r_s = 0.64$, $p < 0.001$). Likewise, there was a statistically significant correlation of ICS focus subscale with

overall self-report ($r_s = 0.22$, $p = 0.04$) and objective EM documentation ($r_s = -0.22$, $p = 0.04$); but, within sites, only site A demonstrated a significant correlation of focus and self-report of EM behaviour ($r_s = 0.34$, $p = 0.03$).

DISCUSSION

In this two-site study measuring the associations between nurse EM attitudes, subjective norms, perceived behavioural control, intention, implementation climate, and implementation leadership with EM self-report and objective behaviour, we found no difference in nurses' perceived EM attitude, social influence, facilitators, barriers, and intention at both institutions. However, we did note differences between sites regarding implementation climate and leadership and objective EM adherence, confirming that climate and leadership can moderate EM intentions and behaviour. The tertiary academic medical centre (site B) implementation climate and leadership was more supportive compared with the regional community medical centre (site A), with the academic medical centre having high self-reported EM adherence, whereas the regional

community medical centre had high self-reported EM adherence along with strong objective EM adherence via EHR documentation. Our findings suggest the importance of context-based implementation strategy development and testing to enhance EM adherence and streamlined EM documentation for accurate adherence measurement, monitoring, and feedback.

Our findings build off prior studies regarding implementation of EM in critically ill patients. Documentation of EHR has been found to significantly underestimate the frequency of turning and repositioning, sitting, transferring, and standing/pre-gait events in critically ill patients as compared with clinician annotated video, but excellent agreement with sitting out-of-bed and ambulation events.¹⁴ Possible explanations for differences in self-reported EM and EHR documentation at the tertiary academic medical centre could be a higher patient acuity level, more competing demands for nurse time, potentially complicated documentation processes, or more pre-gait/standing EM activities rather than ambulatory events compared with the regional community medical centre. The academic medical centre is a magnet-certified institution and may have stronger leadership support with a stronger focus and recognition of EBP. Conversely, the non-magnet regional medical centre nurses perceived a less strong implementation climate and leadership, but both self-reported and objective documentation of EM were greater on these units. EM implementation strategies and future research should take into consideration context-specific factors related to TPB domains, implementation climate, and implementation leadership in addition to documentation processes, differences in patient population, and individual nurse-specific factors.

Processes for delivering EM in the ICU can substantially impact EM performance and vary based on application of interdisciplinary teams, mobility staff, mobility protocols, interdisciplinary education, opinion leaders/peer champions, interprofessional communication, and programmatic feedback mechanisms to the work system.¹⁶ We found that subscales of TPB influenced self-reported and objective EM differently within the regional community medical centre. It may be that individual nurse beliefs, in lieu of stronger unit leadership advocating for EM, has greater impact on self-reported and documented EM. Individual nurse beliefs may be less likely to persist in environments that have significant EM leadership advocacy at baseline. Institution-specific external factors (eg, complicated documentation processes, excessive demands on nursing time, attention) could also compound on discrepancies in leadership advocacy.

Consultation from rehabilitation professionals (eg, physical/occupational therapy) may also influence nurse intention to perform and document EM activities. Variation and/or lack of clearly defined processes are structural policy and protocol barriers that require

targeted implementation strategies.^{8 17} Both participating hospitals have implemented nurse-facilitated EM protocols but have no appointed ICU EM team. While nursing staff provide much EM, physical therapy, occupational therapy, and other interprofessional champions may advocate for a positive EM implementation climate while also providing explicit processes and manpower to accomplish EM.^{8 18 19} Strong rehabilitation advocacy from interprofessional leadership may impact both self-reported EM behaviour as well as EM documentation. Future studies should consider systematic efforts to influence ICU climate that prioritise an interprofessional approach to successfully implement EM.

LIMITATIONS

The generalisability of our results is limited by a small convenience sample of nurses in the two medical centres in middle Tennessee, though we do report findings from a large academic medical centre and a smaller regional medical centre. First, compared with the overall demographics of the US nursing workforce, our sample is younger, less racially diverse, and more educated with a higher percentage of bachelor-prepared nurses.²⁰ Second, our results are subject to response bias for the nurses who responded, since those who participated may be more likely to have positive views of EM. Third, we defined EM adherence as documentation in the EHR as it was not feasible for our study team to perform observational measurement of EM behaviours. This may underestimate the amount of objective EM that occurred, especially within the academic medical centre. Fourth, we did not evaluate patient factors influencing nurse EM behaviours. Lastly, we did not gather data regarding the leadership of other professionals, such as physical therapy, that may substantially impact nursing beliefs and behaviours as well as implementation culture.

Clinical implications

Implementation subscale scores suggest a climate that prioritises, recognises, and possesses team members who are receptive to EBP and perseverant leadership were significantly correlated with EM adherence in our non-magnet regional medical centre site. Use of multiple targeted implementation strategies such as incentives, feedback strategies that recognise top performers, and recruiting and training staff and leadership for EBP openness and perseverance could improve EM adherence in similar contexts.²¹ Additionally, with regards to the magnet-designated institution, identifying barriers to documentation of EM are vital to improving implementation by facilitating and streamlining simplified EM documentation into normal nursing workflow.

CONCLUSION

Our study identified contextual differences in implementation climate and leadership influence when comparing

nurse self-report and documentation of EM behaviours in a tertiary academic medical centre and regional community medical centre. Streamlined documentation, strong leadership advocacy for interprofessional coordination and manpower support for EM, and multicomponent context-based implementation strategies could contribute to better EM documentation and adherence.

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Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by Vanderbilt University (191963). Institutional review board approval (IRB) was obtained from the applicable University IRBs. Participants gave informed consent to participate in the study before taking part.

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Evidence-Based Practice Opinion Survey

This research study is focused on activities in the critical care unit. Initially, you will be asked to complete a survey. The survey will take approximately 10-15 minutes. This survey is designed to gather information about your opinions on performing early mobility for your patients in the ICU. After reading each statement, circle the number that **matches your immediate judgment** rating your opinion as 1 of 7 numbers. There are no right or wrong answers to the questions. All responses to this survey are anonymous and confidential. Your name is not needed.

For the purpose of this study, early mobility is defined as activities from range of motion to ambulation occurring within the first days of critical illness (www.icudelirium.org). Early mobility may consist of performing (a) **passive/active range of motion (ROM)**; (b) **sitting on the edge of the bed**; (c) **active transfer to chair**; or (d) **ambulation**.

The ICU leadership has nothing to do with this survey or this research study. Please answer all questions referencing your current critical care unit and hospital. Your answers will in no way impact your job. Your participation is completely voluntary. There are no consequences for not completing this survey. You may withdraw from allowing the researcher to review documentation of your early mobility practices. This study holds no foreseeable risks or harm to either you or your patient. There are no direct benefits to you by participating in this study.

If you have questions about your rights as a research participant or wish to obtain information, ask questions, or discuss any concerns about this survey with someone other than the investigator, please contact Human Research Protection Program, 1313 21st Ave. South, Suite 504, Nashville, TN 37232-4315 (phone 1-866-224-8273). If you have any questions for the researchers please contact Leanne Boehm at 615-343-1051 or Susan Piras at 931-372-6810.

By answering the survey questions, you voluntarily agree to participate in this research and include your responses in the results.

Thank you very much for your participation in this study.

Hospital: _____

Intensive Care Unit: _____

Evidence-Based Practice Opinion Survey

Most questions in this survey use a 7-point rating scale. In this section, please choose the number that best describes your opinions about early mobility. For example, in question #1 if you completely disagree with the opinion described, circle 1 -'extremely disagree' and if you have a completely favorable opinion to the statement, circle 7 -'extremely agree'.

1. I can decrease patient complications, such as risk for pneumonia and pressure ulcers, by performing early mobility.

extremely disagree: 1 2 3 4 5 6 7 : extremely agree

2. Performing early mobility for my patient is difficult because there is a lack of staff to help perform this task.

extremely disagree: 1 2 3 4 5 6 7 : extremely agree

3. The unit PT/OT staff performs early mobility with my patient.

extremely disagree: 1 2 3 4 5 6 7 : extremely agree

4. Patient equipment, such as chest tubes, dialysis catheters, and invasive lines make it difficult to perform early mobility.

extremely disagree: 1 2 3 4 5 6 7 : extremely agree

5. My concern for the patient's clinical status (hemodynamic status, level of consciousness, line displacement) prevents me from performing early mobility.

extremely disagree: 1 2 3 4 5 6 7 : extremely agree

6. The RNs on my unit perform early mobility with their patients on a daily basis.

extremely disagree: 1 2 3 4 5 6 7 : extremely agree

7. I feel social pressure from the PT/OT staff to perform early mobility for my patient.

extremely disagree: 1 2 3 4 5 6 7 : extremely agree

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8. Performing early mobility can sometimes be risky and harmful for my patient.

extremely disagree: 1 2 3 4 5 6 7 : **extremely agree**

9. I want to perform early mobility on a daily basis for my ICU patient.

extremely disagree: 1 2 3 4 5 6 7 : **extremely agree**

10. Early mobility is an important job requirement that improves patient outcomes.

extremely disagree: 1 2 3 4 5 6 7 : **extremely agree**

11. I intend to perform early mobility with my patient.

extremely disagree: 1 2 3 4 5 6 7 : **extremely agree**

12. The risk of patient falls is a concern when performing early mobility.

extremely disagree: 1 2 3 4 5 6 7 : **extremely agree**

13. The RN peer group on my unit think it is important to perform early mobility.

extremely disagree: 1 2 3 4 5 6 7 : **extremely agree**

14. I am likely to perform early mobility for my patient as part of my daily routine.

extremely unlikely: 1 2 3 4 5 6 7 : **extremely likely**

15. When staff is available to help, I am _____ to perform early mobility.

extremely unlikely: 1 2 3 4 5 6 7 : **extremely likely**

16. When early mobility equipment (e.g., cardiac walker, lift equipment, portable monitor) is conveniently located and in good working order, I am _____ to perform early mobility.

extremely unlikely: 1 2 3 4 5 6 7 : **extremely likely**

17. Performing early mobility to decrease the patient's length of hospital stay is:

desirable: 1 2 3 4 5 6 7 : **not desirable**

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18. Performing early mobility to decrease patient complications, such as risk for pressure ulcers and pneumonia is:

not important to me: 1 2 3 4 5 6 7 : important to me

19. When it comes to early mobility, I want to do what my RN peer group thinks is important to do.

not important to me: 1 2 3 4 5 6 7 : important to me

20. When it comes to early mobility, I want to do what the healthcare providers (e.g., NP, MD) think I should do.

not important to me: 1 2 3 4 5 6 7 : important to me

21. In the ICU, I perform early mobility for my patient on a daily basis ___% of the time.

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

22. On your unit, list the one factor that makes it easier or enables you to perform early mobility.

a) _____

23. On your unit, list the one factor that makes it difficult or prevents you from performing early mobility.

a) _____

Evidence-Based Practice Opinion Survey

Implementation Climate Scale

This 18-item measure assesses the degree to which there is a strategic organizational climate supportive of evidence-based practice implementation. Implementation climate is defined as employees' shared perceptions of the policies, practices, procedures, and behaviors that are rewarded, supported, and expected in order to facilitate effective EBP implementation.

Note: This measure can be adapted to study climate for evidence-based practice implementation for teams/work groups or entire organizations. Please choose a single referent point for all of the items (e.g., team or agency).

Instructions: Please indicate the extent to which you agree with each statement.

0	1	2	3	4
Not at all	Slight extent	Moderate extent	Great extent	Very great extent

Focus on Evidence-Based Practice

1. One of this team/agency's main goals is to use evidence-based practices effectively..... 0 1 2 3 4
2. People in this team/agency think that the implementation of evidence-based practices is important..... 0 1 2 3 4
3. Using evidence-based practices is a top priority in this team/agency..... 0 1 2 3 4

Educational Support for Evidence-based Practice

4. This team/agency provides conferences, workshops, or seminars focusing on evidence-based practices..... 0 1 2 3 4
5. This team/agency provides evidence-based practice trainings or in-services..... 0 1 2 3 4
6. This team/agency provides evidence-based practice training materials, journals, etc.... 0 1 2 3 4

Recognition for Evidence-Based Practice

7. Clinicians in this team/agency who use evidence-based practices are seen as clinical experts..... 0 1 2 3 4
8. Clinicians who use evidence-based practices are held in high esteem in this team/agency..... 0 1 2 3 4
9. Clinicians in this team/agency who use evidence-based practices are more likely to be promoted..... 0 1 2 3 4

Evidence-Based Practice Opinion Survey

Rewards for Evidence-Based Practice

10. This team/agency provides financial incentives for the use of evidence-based practices 0 1 2 3 4
11. The better you are at using evidence-based practices, the more likely you are to get a bonus or a raise..... 0 1 2 3 4
12. This team/agency provides the ability to accumulate compensated time for the use of evidence-based practices..... 0 1 2 3 4

Selection for Evidence-Based Practice

13. This team/agency selects staff who have previously used evidence-based practice..... 0 1 2 3 4
14. This team/agency selects staff who have had formal education supporting evidence-based practice 0 1 2 3 4
15. This team/agency selects staff who value evidence-based practice..... 0 1 2 3 4

Selection for Openness

16. This team/agency selects staff who are adaptable..... 0 1 2 3 4
17. This team/agency selects staff who are flexible..... 0 1 2 3 4
18. This team/agency selects staff open to new types of interventions 0 1 2 3 4

Evidence-Based Practice Opinion Survey

Implementation Leadership Scale

Please indicate the extent to which you agree with each statement.

0 Not at all	1 Slight extent	2 Moderate extent	3 Great extent	4 Very great extent
Proactive				
1. [Name of Supervisor] has developed a plan to facilitate implementation of evidence-based practice				
0	1	2	3	4
2. [Name of Supervisor] has removed obstacles to the implementation of evidence-based practice				
0	1	2	3	4
3. [Name of Supervisor] has established clear department standards for the implementation of evidence-based practice				
0	1	2	3	4
Knowledgeable				
4. [Name of Supervisor] is knowledgeable about evidence-based practice				
0	1	2	3	4
5. [Name of Supervisor] is able to answer my questions about evidence-based practice				
0	1	2	3	4
6. [Name of Supervisor] knows what he or she is talking about when it comes to evidence-based practice				
0	1	2	3	4
Supportive				
7. [Name of Supervisor] recognizes and appreciates employee efforts toward successful implementation of evidence-based practice				
0	1	2	3	4
8. [Name of Supervisor] supports employee efforts to learn more about evidence-based practice				
0	1	2	3	4
9. [Name of Supervisor] supports employee efforts to use evidence-based practice				
0	1	2	3	4
Perseverant				
10. [Name of Supervisor] perseveres through the ups and downs of implementing evidence-based practice				
0	1	2	3	4
11. [Name of Supervisor] carries on through the challenges of implementing evidence-based practice				
0	1	2	3	4
12. [Name of Supervisor] reacts to critical issues regarding the implementation of evidence-based practice by openly and effectively addressing the problem(s)				
0	1	2	3	4

Evidence-Based Practice Opinion Survey

Descriptive Information

1. Please indicate your highest degree of education:

Diploma Associate Bachelor's Master's Doctoral

2. Number of years experience in your profession (RN, RT, PT/OT, Care Partner): _____

3. Number of years working at this institution: _____

4. Number years working on this unit: _____

5. Employment status:

Employee of hospital Agency/Travel Institutional float pool

6. On which shift do you primarily work (please select one)?

_____ 12 Hour Day (e.g., 7am – 7pm)

_____ 12 Hour Night (e.g., 7pm – 7am)

_____ Rotate (No primary shift)

7. Hours worked per week: _____

8. Age: _____

9. Gender: Male Female Other: _____

10. Which of the following would you say best represents your race?

American Indian

White/Caucasian

Black/African American

Asian

Pacific Islander

11. Are you Hispanic or Latino? Yes No