RESEARCH ARTICLE

ICU quasi-speciality nurses' knowledge, attitudes and practices regarding early mobilization: A cross-sectional survey

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Abstract

Aim: Early mobilization (EM) improves critical illness survivors' clinical outcomes. This study examines ICU quasi-specialty nurses' EM-related knowledge, attitudes and practices (KAP).

Design: This cross-sectional study was conducted at a provincial ICU specialty nurse training site from 2019 to 2021. KAP data were collected using a self-report questionnaire.

Methods: Participants were registered nurses enrolled in the training programme; 485 nurses from 188 hospitals completed the questionnaire.

Results: Of the participants, 37.7% had EM training, and 30.7% reported their wards performed EM. Median (IQR) scores for knowledge, attitudes and practices were 14.0 (4.0), 47.0 (9.0) and 37.0 (8.0), belonging to medium, high and medium levels. Scores were lowest for EM scope, implementation indicators and out-of-bed mobilization. There were significant deviations in KAP scores amongst nurses at different levels of hospitals with EM training and whose departments performed EM. Significant positive correlations between knowledge and practice, and attitude and practice were identified.

KEYWORDS
attitude, early mobilization, knowledge, practice, specialty nurse

1 | INTRODUCTION

As the number of survivors of critical illness has increased, so have morbidity and long-term sequelae, threatening patients' safety and life quality (Doiron et al., 2018; Vanhorebeek et al., 2020). Evidence suggests that early mobilization (EM) can be an effective intervention in improving critically ill patients' outcomes, such as reducing the occurrence of intensive care unit–acquired weakness (ICU-AW), shortening the duration of delirium and ICU/hospital stay

and improving the physiological function. (Lai et al., 2017; Paton et al., 2018; Schweickert et al., 2009; Zang et al., 2020). Clinical guidelines recommend implementing EM to improve critically ill patients' clinical outcomes (Devlin et al., 2018). However, gaps and variations exist in EM implementation in different environments (Alaparthi et al., 2020).

Current evidence shows that patient-related, structural, cultural and process-related barriers could impede EM delivery (Alaparthi et al., 2020). Clinicians' (i.e. nurses, physicians, respiratory therapists

and physiotherapists) knowledge and awareness could impact EM's clinical practice (Anekwe et al., 2019; Costa et al., 2017). Thus, many scholars are concerned about the care providers' knowledge, attitudes and practice (KAP) regarding EM in ICU (Lin et al., 2020; Wang et al., 2020; Zhang et al., 2021). Most studies outside of China have revealed EM's benefits, and participants hold positive attitudes but insufficient knowledge about and practice of EM (Akhtar & Deshmukh, 2021; Fontela et al., 2018; Koo et al., 2016; Lin et al., 2020). In China, many studies conducted in different provinces, and populations have shared similar results (Liu, 2018; Wang, 2019).

Additionally, respiratory therapists and nurses are the primary practitioners of EM in China (Wang et al., 2020). Studies on ICU nurses from China's first-tier cities (i.e. cities with a population of more than ten million) (Wang et al., 2020; Zhang et al., 2021) and Nanchang city (Cha et al., 2018) have shown variations regarding these nurses' KAP towards EM. For instance, a survey of 11 hospitals in first-tier cities found that only 2.5% of ICU nurses had good knowledge regarding EM, but 31.4% of nurses had positive attitudes towards EM (Zhang et al., 2021). Guizhou Province lies in southwest China, and its gross domestic product was at the 22nd rank amongst 31 provinces in China in 2021, indicating the underdevelopment of this area. Studies related to EM performance of ICU patients in this province are rare. Thus, related studies are needed.

ICU specialty nurses are an essential group of ICU nurses. Evidence shows that ICU specialty nurses' EM-related KAP scores were higher than those of general ICU nurses (Cha et al., 2018). A specialty nurse is a clinical nurse with a high level of expertise in a particular nursing field (Wong, 2018). Registered nurses who want to be specialty nurses need several years of working experience and completion of the specialty nurse training courses. Registered nurses enrolled in specialty nurse training courses but have not completed all the courses are quasi-specialty nurses. Hence, we deemed that ICU quasi-specialty nurses are nurses who have enrolled in a specialty nurse training course but have not completed it as of the survey date.

In Guizhou Province, registered nurses who want to participate in an ICU specialty nurse training course must possess 3 years of clinical experience and at least 1 year of working in the ICU. The ICU specialty nurse training programme includes theory lectures (1 month) and skill training (2 months). EM theory and practice training are essential in the programme, which may impact their EM-related KAP status quo. ICU quasi-specialty nurses are a particular group whose EM performance could somewhat represent their departments' clinical practice level. Hence, obtaining the EM-related KAP status quo of the ICU-quasi-specialty nurses in Guizhou Province before they have received EM training from the specialty nurse training programme is helpful for indirectly analysing the EM performance in ICU.

Therefore, a cross-sectional survey was conducted from 2019 to 2021 to assess the nurses' KAP for EM in Guizhou Province. In this study, we evaluated the ICU quasi-specialty nurses' EM-related KAP status quo.

2 | THE STUDY

2.1 | Design and setting

This study was a cross-sectional survey conducted at a provincial specialty nurse training site from 2019 to 2021. Approximately 140–200 ICU nurses from the Guizhou Province participate in this site's specialty nurse training courses each year. Each training programme lasts 3 months, including 1 month of theoretical knowledge lectures (160 class hours) and 2 months of clinical practice placement (320 class hours). Once nurses finish all the courses and meet the assessment standards, they are granted the specialty nurse certificate in critical care medicine by the nursing association of Guizhou Province. The training content of the programme mainly includes the following: (1) development status and trends of critical care nursing; (2) the aetiology, pathology, clinical manifestations, treatment, and nursing of acute and critical diseases; (3) monitoring, supporting, rescue and nursing technology for critically ill patients; (4) the usage and management of equipment used in ICU; (5) hospital infection prevention and control; (6) patient's psychological care and communication; and (7) evidence-based nursing and research. EM-related training includes 2 hr of theoretical lectures (the second week of the theoretical training session) and 4 hr of clinical practice (clinical placement session). Besides that, if nurses show interest in EM, they can participate in EM implementation during the clinical placement.

2.2 | Participants

Convenience sampling (Setia, 2016) was used to select participants. Registered nurses participating in critical illness specialty training programmes between 2019 and 2021 were eligible for this study. The inclusion criteria were participants who (1) had worked in an ICU for at least 1 year, (2) had not completed the specialty nurse training course as of the survey day, (3) had not received EM-related training from the specialty nurse training programme as of the survey day and (4) knew the purpose of the study and agreed to take part in the study voluntarily. The exclusion criterion was nurses who were currently not working in the ICU.

2.3 | Method

A questionnaire was formed based on Liu's study (2018) "Healthcare workers' knowledge, attitudes, and practice towards EM in ICU" to collect data. Before conducting the study, the final questionnaire was imported into a "questionnaire star" website (https://www.wjx.cn/). When registered nurses enrolled in the specialty nurse training programme, workers at the training site created WeChat workgroups to enhance communication amongst the trainees for each training programme: all the registered nurses (514) enrolled in the specialty nurse training programme were in the WeChat workgroups. In the

first week of the training programme, the researchers explained the survey's aims, content and data usage to the nurses in writing in the WeChat workgroup. After obtaining respondents' verbal informed consent (i.e. "agree" replied by the nurses in the WeChat workgroups), the questionnaire's link (https://www.wjx.cn/vm/QSfaFZ1.aspx) was shared with the nurses in the WeChat workgroup. Each trainee voluntarily responded to the questionnaire.

Given that this study's participants were ICU quasi-specialty nurses, the researchers changed some items in the introduction and the demographic session of Liu's (2018) questionnaire. The KAP questionnaire in this study was the same as that in Liu's (2018), so we had not tested its psychometric properties. According to the study by Liu (2018), she evaluated the questionnaire's psychometric properties by soliciting experts and pilot tests. And she found that the questionnaire's item content validity was 0.90, and Cronbach's alpha coefficients for the knowledge, attitudes, and practices sections were 0.731, 0.867, and 0.822, respectively, indicating that the questionnaire had good reliability and validity.

The final questionnaire for this study included an introduction and two parts, with 53 items. The introduction provided information on the survey's aims, content and data usage and highlighted voluntary survey participation. The first part included nine questions on participants' demographic characteristics, such as their working years, nursing education levels, whether they received EM-related training. The second section included KAP's three dimensions. Regarding EM-related knowledge, there were 21 items, including EM-related definition, scope, starting indicators, monitoring indicators and stopping indicators. Each item had three possible answers: yes, no and unsure. Only correct answers were given 1 point; wrong or unsure answers were scored as 0 (i.e. the researchers had checked and discussed the right answer for each item in this section, so the researchers know how to score each item when analysing the collected data). The scores of this section ranged from 0 to 21, and participants' scores were categorized into three levels based on the study by Liu (2018): low (0–7), medium (8–14) and high (15–21). The researchers in this study categorized the correct rate for each item into the low level (lower than 50%) and high level (more than 51%) to describe the results. The attitude dimension included 11 items, covering nurses' perspectives on gaining EM knowledge and equipping tools for EM and EM performance. The items were answered on a 5-point Likert scale: strongly disagree (1 point), disagree (2 points), neutral (3 points), agree (4 points) and strongly agree (5 points). The total possible score on this dimension was 55, and participants' scores were categorized into three levels: low (1–18), medium (19–36) and high (37–55) (Liu, 2018). Besides that, each item's score was categorized into three levels based on the score and meaning (i.e. score1-2 belongs to disagree category, score 3 means the neutral category; score 4–5 means the agree category) determined by the researcher in this study: negative (1–2), neutral (3) and positive (4–5). The practice section had 12 items on EM-related practices and education, which were also answered on a 5-point Likert scale: never (1 point), occasionally (2 points), sometimes (3 points), often (4 points) and always (5 points). The maximum possible score in this section

was 60, and participants' scores were categorized into three levels: low (1–20), medium (21–40) and high (41–60) (Liu, 2018). Each item's score was categorized into three levels based on their meaning and score (i.e. score1-2 belongs to low frequency, score 3 means the neutral frequency; score 4–5 means high frequency) determined by the researchers in this study: low (1–2), medium (3) and high (4–5).

2.4 | Analysis

Statistical software IBM SPSS v22.0 (IBM Inc.) was used to analyse the data. Descriptive statistics were used to present the responses for all variables, including frequencies, percentages and medians (interquartile ranges [IQRs]). Skewness, Kurtosis and Q-Q plots were used to test the normality of data distribution. We also analysed the differences in KAP scores amongst participants' demographic variables with the Mann–Whitney U test (two groups) and Kruskal–Wallis H test (three or more groups). Kendall's tau-b test was used to analyse the relationships amongst KAP scores. For all analyses, p-values <.05 were considered statistically significant. For Kendall's tau-b test, τ_b less than + or − 0.10 indicated very weak correlation, τ_b + or − 0.10 to 0.19 indicated weak correlation, τ_b + or − 0.20 to 0.29 indicated moderate correlation, and τ_b + or − 0.30 or above indicated strong correlation (Botsch, 2011).

2.5 | Ethics

This study was conducted according to the principles of the Declaration of Helsinki. Before data collection, the study gained approval from the medical ethics committee at the training site (No: 2018–96). Nurses participated in the survey voluntarily. Their anonymity and confidentiality were guaranteed. Besides that, the researcher had gained text permission for the KAP questionnaire from its creator Liu.

3 | RESULTS

3.1 | Participants' demographic and professional characteristics

From 2019 to 2021, 514 ICU nurses participated in the specialty nursing programme at the training site, and 94.4% (485/514) of these nurses responded to the survey. The respondents were from 188 hospitals in Guizhou Province. Their median (IQR) age was 29 (5) years, and their median (IRQ) years of service were 7 (4) years. Amongst them, 82.5% (400 of 485) were women, 65.2% (316 of 485) had a bachelor's degree and 84.9% (412 of 485) had a junior title. Additionally, ICU quasi-specialty nurses trained in EM accounted for 37.7% (183 of 485), and only 30.7% (149 of 485) reported that their wards performed EM with patients. Detailed demographic characteristics are shown in Table 1.

3.2 | Participants' knowledge regarding early mobilization

Regarding ICU quasi-specialty nurses' knowledge of EM in the ICU, the maximum possible score was 21. The median (IQR) for participants' overall score was 14.0 (4.0), which belonged to the medium level. The percentage of correct answers for the 21 questions ranged between 7.4% and 94.6%. In particular, the correct rates for

TABLE 1 Participants' demographic characteristics

Variables (N = 485)	Categories	Frequency	Percentage
Gender	Male	85	17.5
	Female	400	82.5
Age median (IQR)	29 (5)		
Age (year)	20–25	47	9.7
	26–30	262	54.0
	31–35	156	32.2
	≥36	21	4.3
Years of service median (IQR)	7 (4)		
Years of service (year)	≤5	165	34.0
	6–10	278	57.3
	≥11	42	8.7
Nursing educational level	Technical school	4	0.8
	Junior college	165	34.0
	Bachelor's degree	316	65.2
Professional title	Junior	412	84.9
	Intermediate	73	15.1
Received EM training	Yes	183	37.7
	No	302	62.3
Your department performed EM for patients	Yes	149	30.7
	No	336	69.3
Hospital level	Secondary A	282	58.1
	Secondary B	43	8.9
	Tertiary A	101	20.8
	Tertiary B	59	12.2
Surveying year	2019	148	30.5
	2020	144	29.7
	2021	193	39.8

Note: Secondary A, hospitals deserved scores ≥900 during the national hospital review based on the evaluation criteria for secondary hospital standard; Secondary B, hospitals deserved scores between 750 to 899 during the national hospital review based on the evaluation criteria for secondary hospital standard; Tertiary A, hospitals deserved scores ≥900 during the national hospital review based on the evaluation criteria for tertiary hospital standard; Tertiary B, hospitals deserved scores between 750 to 899 during the national hospital review based on the evaluation criteria for tertiary hospital standard.
Abbreviations: EM, early mobilization; IQR, interquartile range.

inquiries related to mobilization types, starting and stopping indicators for EM, and out-of-bed mobilization for patients on mechanical ventilation were lower than 50% (Items 3, 6, 12, 13 and 17). Further information is provided in Table 2.

3.3 | Participants' attitudes towards early mobilization

Regarding ICU quasi-specialty nurses' attitudes towards EM in the ICU, the total score was 55.0. The median (IQR) for participants' total score was 47.0 (9.0), which belonged to the high-level score category. Scores for each item ranged from 4.0 (1.0) to 5.0 (1.0), indicating that nurses' attitudes towards EM in the ICU were positive (Table 3).

3.4 | Participants' practices regarding early mobilization

Regarding nurses' practices related to EM in the ICU, the total score was 60. The median (IQR) for participants' total score was 37.0 (8.0), which belonged to the medium level. The scores for each item ranged between 1.0 (0) and 4.0 (1.0). Notably, questions associated with out-of-bed mobilization for patients with or without mechanical ventilation obtained the lowest scores: Item 8, 2.0 (2.0); Item 9, 1.0 (0). Moreover, 76.1% (369 of 485) of the nurses reported never helping ventilated patients with out-of-bed mobilization, whilst 35.7% (173 of 485) never did so for patients not on mechanical ventilation. By contrast, participants scored higher on items that encouraged and guided patients to mobilize (Table 4).

3.5 | Differences in the KAP scores amongst participants' demographic variables

This study also analysed the differences in the KAP scores amongst participants' demographic variables. The results showed significant differences in EM-related knowledge scores amongst nurses who had received EM training, whose departments implemented EM, and those from different levels of hospitals ($p < .05$). The EM-related attitude scores differed significantly amongst nurses with different nursing educational levels ($p < .05$). Nurses' EM-related practice scores also showed differences in nurses who received EM training and their department implemented EM ($p < .05$). Further details are shown in Table 5.

3.6 | Correlations amongst participants' KAP scores

The results showed a weak positive correlation between knowledge and practice scores ($\tau_b = 0.120$, $p < 0.001$) and a moderate positive correlation between attitude and practice scores ($\tau_b = 0.223$,

TABLE 2 Results of participants' knowledge of early mobilization in the ICU

Item	Yes N (%)	No N (%)	Unsure N (%)	Correct N (%)	Score Median (IQR)
1. Early mobilization refers to physical therapy administered to patients by medical staff within one week of ICU admission	361 (74.4)	54 (11.1)	70 (14.4)	361 (74.4)	1.0 (1.0)
2. Early mobilization is an element of the ABCDE bundle (awakening, breathing, coordination, delirium monitoring, early mobilization)	245 (50.5)	28 (5.8)	212 (43.7)	245 (50.5)	1.0 (1.0)
3. Early mobilization only includes active and passive exercise in bed	258 (53.2)	179 (36.9)	48 (9.9)	179 (36.9)	0 (1.0)
4. Assisting patients with exercise could help promote alertness, increase perfusion, and trigger spontaneous breathing	435 (89.7)	17 (3.5)	33 (6.8)	435 (89.7)	1.0 (0)
5. Early mobilization could improve patients' respiratory function	444 (91.5)	14 (2.9)	27 (5.6)	444 (91.5)	1.0 (0)
6. Patients on mechanical ventilation should be strictly in bed and are forbidden to move to the ground to prevent danger and injury	240 (49.5)	218 (44.9)	27 (5.6)	218 (44.9)	0 (1.0)
7. Bedside cycling could be used for active and passive activity	295 (60.8)	17 (3.5)	173 (35.7)	295 (60.8)	1.0 (1.0)
8. Electrical muscle stimulation is a kind of early mobilization for ICU patients	340 (70.1)	15 (3.1)	130 (26.8)	340 (70.1)	1.0 (1.0)
9. Early mobilization is unrelated to the incidence and severity of delirium in ICU patients	123 (25.4)	299 (61.6)	63 (13.0)	299 (61.6)	1.0 (1.0)
10. The frequency of early mobilization for ICU patients is one to two times per day	395 (81.4)	29 (6.0)	61 (12.6)	395 (81.4)	1.0 (0)
11. The appropriate duration of early mobilization is generally 30 minutes each time	375 (77.3)	44 (9.1)	66 (13.6)	375 (77.3)	1.0 (0)
12. Early mobilizations should be suspended if systolic blood pressure is over 160 mmHg	414 (85.4)	36 (7.4)	35 (7.2)	36 (7.4)	0 (0)
13. Patients who use vasoactive drugs to maintain hemodynamic stability cannot perform active exercise (i.e. bedside sitting and ambulation activities.)	367 (75.7)	63 (13.0)	55 (11.3)	63 (13.0)	0 (0)
14. Early mobilization should consider the patient's condition, follow the principle of gradual progress, begin with passive activity, and gradually transition to active training	459 (94.6)	7 (1.4)	19 (3.9)	459 (94.6)	1.0 (0)
15. Patients' early mobilization plans include type, frequency, time, and intensity	436 (89.9)	6 (1.2)	43 (8.9)	436 (89.9)	1.0 (0)
16. Patients' early mobilization should consider patients' sedation and analgesia status.	309 (63.7)	90 (18.6)	86 (17.7)	309 (63.7)	1.0 (1.0)
17. RASS score should be used as an assessment indicator for early mobilization, and early mobility can be performed only if the RASS score is more than 1	80 (16.5)	80 (16.5)	195 (40.2)	80 (16.5)	0 (0)
18. ICU-AW occurrence could increase patients' mortality risk and impact patients' rehabilitation	420 (86.6)	11 (2.3)	54 (11.1)	420 (86.6)	1.0 (0)
19. Long-term bed confinement and immobility is one of the significant risk factors for developing ICU-AW	439 (90.5)	16 (3.3)	30 (6.2)	439 (90.5)	1.0 (0)
20. MRC sum scores could be used to diagnose ICU-AW.	281 (57.9)	14 (2.9)	190 (39.2)	281 (57.9)	1.0 (1.0)
21. Early mobilization performance could decrease ICU-AW incidence and improve patients' clinical outcomes	419 (86.4)	14 (2.9)	52 (10.7)	419 (86.4)	1.0 (0)
Total					14.0 (4.0)

Abbreviations: ICU-AW, intensive care unit–acquired weakness; IQR, interquartile range; MRC, medical research council; RASS, Richmond agitation-sedation scale.

$p < 0.001$). However, no statistically significant positive correlation was identified between knowledge and attitude scores ($\tau_b = 0.063$, $p = 0.055$; Table 6).

4 | DISCUSSION

This study's results showed that ICU quasi-specialty nurses had medium-level knowledge of EM in the ICU. Specifically, participants' scores were the lowest for items related to EM starting, monitoring and stopping indicators and out-of-bed mobilization for ventilated patients. Most participants chose the incorrect answer for EM's scope. In comparison, they had good knowledge regarding the benefits of EM for patients. A study from first-tier cities by Wang et al. (2020) reported that nurses had good knowledge of EM's benefits and stopping indicators, but poor understanding of the population in which EM is useful and monitoring indicators during EM, which was inconsistent with our findings. This difference may be explained by the different participants' characteristics (i.e. educational background, survey sites, hospital levels and resources available) and different questionnaires utilized in the two studies. Zhang et al. (2019) discovered that ICU quasi-specialty nurses have good knowledge of EM

of patients on mechanical ventilation. Lin et al. (2020) reported that nurses' knowledge about EM was 4.1 (standard deviation [SD] = 1.4) out of a possible correct score of 6. The differences between their studies and our research may be attributed to the different research sites or the different instruments. In total, the items of EM-related knowledge questionnaires of the studies above (Lin et al., 2020; Wang et al., 2020; Zhang et al., 2019) shared similar contents of definition, members, element, indication, exclusions, method and effect with our study. However, each questionnaire has a different focus and items. For example, the questionnaire in the study by Lin et al. (2020) just has six items on mechanical ventilation patients' EM-related knowledge, and they adopt different methods of scoring, which are different from ours. In addition, only 37.7% (183 of 485) of the participants in the present study had received EM training, which was lower than what has been reported elsewhere (Anekwe et al., 2019; Zhang et al., 2021). A lack of EM knowledge or a low level of EM knowledge could cause poor EM implementation (Potter et al., 2021). Mohamed et al. (2020) reported that education could improve nurses' knowledge and practices. The present study highlights the need for EM education for ICU quasi-specialty nurses. In particular, training focussed on the starting and stopping indicators and scope of EM may help them improve their EM knowledge.

TABLE 3 Results of participants' attitudes towards early mobilization in the ICU

Items	Strongly disagree/1 point (N, %)	Disagree/2 points (N, %)	Neutral/3 points (N, %)	Agree/4 points (N, %)	Strongly agree/5 points (N, %)	Score (median, IQR)
1. I am interested in EM-related knowledge	7 (1.4)	3 (0.6)	38 (8.0)	228 (47.0)	208 (42.9)	4.0 (1.0)
2. I think physicians and nurses in the ICU should know EM-related knowledge well	4 (0.8)	0	16 (3.3)	210 (43.3)	255 (52.6)	5.0 (1.0)
3. I agree that EM is a vital care routine and should be valued in the ICU	4 (0.8)	0	17 (3.5)	223 (4c6.0)	241 (49.7)	4.0 (1.0)
4. I think delivering EM to patients could show my working competency	7 (1.4)	36 (7.4)	62 (12.8)	220 (45.4)	160 (33.0)	4.0 (1.0)
5. I think EM could improve patients' satisfaction	5 (1.0)	4 (0.8)	49 (10.1)	239 (49.3)	188 (38.8)	4.0 (1.0)
6. I think physicians and nurses in the ICU should receive formal EM-related education and training	3 (0.6)	0	14 (2.9)	211 (43.5)	257 (53.0)	5.0 (1.0)
7. I think EM could improve patient prognosis.	4 (0.8)	2 (0.4)	14 (2.9)	227 (46.8)	238 (49.1)	4.0 (1.0)
8. I think physicians and nurses in the ICU should take responsibility for delivering EM to patients	6 (1.2)	10 (2.1)	65 (13.4)	232 (47.8)	172 (35.5)	4.0 (1.0)
9. I think the ICU should be staffed with dedicated rehabilitation therapists	4 (0.8)	1 (0.2)	23 (4.7)	199 (41.0)	258 (53.2)	5.0 (1.0)
10. I think it is safe and feasible to perform EM in ICU	4 (0.8)	13 (2.7)	57 (11.8)	230 (47.4)	181 (37.3)	4.0 (1.0)
11. I am willing to perform EM for my patients	4 (0.8)	4 (0.8)	35 (7.2)	253 (52.2)	189 (39.0)	4.0 (1.0)
Total score						47.0 (9.0)

Abbreviations: EM, early mobilization; IQR, interquartile range.

TABLE 4 Results for participants' practices related to early mobilization in the ICU

Practice item	Never/1 point (N, %)	Occasionally/2 points (N, %)	Sometimes/3 points (N, %)	Often/4 points (N, %)	Always/5 points (N, %)	Score (median, IQR)
1. I learn EM-related knowledge actively	25 (5.2)	136 (28)	232 (47.8)	79 (16.3)	13 (2.7)	3.0 (1.0)
2. I discuss EM-related topics with my co-workers	26 (5.4)	188 (38.8)	186 (38.4)	77 (15.9)	8 (1.6)	3.0 (1.0)
3. I assess patients to identify whether their conditions comply with the indications of EM	35 (7.2)	127 (26.2)	179 (36.9)	124 (25.6)	20 (4.1)	3.0 (2.0)
4. I encourage conscious patients to engage in active exercise within their capacities	12 (2.5)	39 (8.0)	104 (21.4)	240 (49.5)	90 (18.6)	4.0 (1.0)
5. I perform passive limb exercises for unconscious patients	14 (2.9)	80 (16.5)	157 (32.4)	189 (39.0)	45 (9.3)	3.0 (1.0)
6. I help patients take the semi-supine position in my daily work	4 (0.8)	13 (2.7)	79 (16.3)	244 (50.3)	145 (29.9)	4.0 (1.0)
7. In my daily work, I help patients sit on the edge of the bed	76 (15.7)	162 (33.4)	158 (32.6)	69 (14.2)	20 (4.1)	3.0 (1.0)
8. In my daily work, I help patients without mechanical ventilation to mobilize out of bed	173 (35.7)	142 (29.3)	100 (20.6)	57 (11.8)	13 (2.7)	2.0 (2.0)
9. In my daily work, I help patients on mechanical ventilation to mobilize out of bed	369 (76.1)	60 (12.4)	37 (7.6)	15 (3.1)	4 (0.8)	1.0 (0)
10. I encourage and help patients perform respiratory training in my daily work	5 (1.0)	23 (4.7)	67 (13.8)	256 (52.8)	134 (27.6)	4.0 (1.0)
11. During visits, I instruct patients' families or caregivers in performing physical function exercises for the patients	11 (2.3)	52 (10.7)	98 (20.2)	220 (45.4)	104 (21.4)	4.0 (1.0)
12. I offer education and comfort to patients who are reluctant to perform EM	25 (5.2)	75 (15.5)	149 (30.7)	177 (36.5)	59 (12.2)	3.0 (1.0)
Total score						37.0 (8.0)

Abbreviations: EM, early mobilization; IQR, interquartile range.

The results indicated that ICU quasi-specialty nurses' attitudes towards EM in the ICU were positive (Table 3). This finding was similar to that of Wang et al. (2020) and Zhang et al. (2019), who found that most respondents showed positive attitudes towards EM. However, Zhang et al. (2021) reported that only 31.4% of the respondent nurses held positive attitudes towards EM. Furthermore, in the study by Wang et al. (2020), 60.8% of nurses support the routine implementation of EM for ICU patients. In our study, 95.7% of the participants agreed with implementing EM as usual care in the ICU. Thus, our result showed a higher support rate than theirs. In general, nurses with a stronger thirst for knowledge and enthusiasm for obtaining promotions in their professional careers are prone to participate in continuing education programmes, which may explain the better results in our study.

Regarding ICU quasi-specialty nurses' practices related to EM in the ICU, participants scored the lowest for implementing out-of-bed mobilization for patients. By contrast, respondents had higher scores for guiding patients to mobilize and instituting in-bed exercise. Concerning ICU patients' mobility levels, Zhu et al. (2018) found a rate of 98.1% for in-bed exercise, 5.7% for sitting on the side of the bed, 21.7% for being transferred to a chair and 2.4% for

walking. Tadyanemhandu et al. (2021) noted that ventilation could impact patients' out-of-bed mobilization. Our results support those findings, as out-of-bed mobilization may require a larger workforce, more equipment, higher knowledge levels and an increased workload for healthcare workers (Anekwe et al., 2019; Capell et al., 2019; Potter et al., 2021). Hence, hospitals should invest more resources to engage ICU quasi-specialty nurses in EM implementation, especially for out-of-bed mobilization.

In addition, this study also explored the differences in KAP scores amongst the participants' demographic variables. The results showed significant differences in EM-related knowledge scores amongst nurses in different levels of hospitals, who received EM training, and whose departments implemented EM. Additionally, nurses with different nursing education levels scored discrepancy points in attitude; nurses who had received EM training and whose departments implemented EM also gained diverse EM-related practice scores. Zhang et al. (2021) found that knowledge scores were higher amongst trained than untrained nurses. Zhang et al. (2019) discovered that training frequency could influence nurses' KAP scores. Parker et al. (2022) indicated that a positive change in contextual culture could support nurses' implementation of EM. In the

TABLE 5 Relationships between participants' demographic characteristics and KAP scores

Variables (N = 485)	Categories	N (%)	Knowledge		Attitude		Practice	
			Statistics	p	Statistics	p	Statistics	p
Gender			−0.169	.866	−0.728	.467	−0.348	.728
	Male	85 (17.5)						
	Female	400 (82.5)						
Age (year)			7.376	.061	4.784	.188	6.482	.090
	20–25	47 (9.7)						
	26–30	262 (54.0)						
	31–35	156 (32.2)						
	≥36	21 (4.3)						
Years of service (year)			1.269	.530	0.322	.851	0.352	.839
	≤5	165 (34.0)						
	6–10	278 (57.3)						
	≥11	42 (8.7)						
Educational background			5.524	.063	9.516	.009[*]	1.753	.416
	Technical school	4 (0.8)						
	Junior college	165 (34.0)						
	Bachelor's degree	316 (65.2)						
Professional title			−1.439	.150	−0.547	.585	−1.598	.110
	Junior	412 (85.0)						
	Intermediate	73 (15.0)						
Received EM training			−6.507	<.001[*]	−0.113	.910	−4.419	<.001[*]
	Yes	183 (37.7)						
	No	302 (62.3)						
Your department performed EM for patients			−4.119	<.001[*]	−1.781	.075	−5.85	<.001[*]
	Yes	149 (30.7)						
	No	336 (69.3)						
Hospital level			11.793	.008[*]	1.952	.582	3.637	.303
	Secondary A	282 (58.1)						
	Secondary B	43 (8.9)						
	Tertiary A	101 (20.8)						
	Tertiary B	59 (12.2)						
Surveying year			0.194	.908	4.184	.123	3.546	.170
	2019	148 (30.5)						
	2020	144 (29.7)						
	2021	193 (39.8)						

Note: Secondary A, hospitals deserved scores ≥900 during the national hospital review based on the evaluation criteria for secondary hospital standard; Secondary B, hospitals deserved scores between 750 to 899 during the national hospital review based on the evaluation criteria for secondary hospital standard; Tertiary A, hospitals deserved scores ≥900 during the national hospital review based on the evaluation criteria for tertiary hospital standard; Tertiary B, hospitals deserved scores between 750 to 899 during the national hospital review based on the evaluation criteria for tertiary hospital standard.

Abbreviation: EM, early mobilization.

[*]$p < .05$, there were significant differences amongst group scores.

present study, only 30.7% of the participants reported that their ICUs delivered EM for patients, which was relatively lower than the percentage reported in other studies in other areas (Bakhru et al., 2015; Watanabe et al., 2021; Zhu et al., 2018). Johnson et al. (2017)

suggested that tailored education programmes positively affected nurses' attitudes, and a protocol for EM can guide EM implementation. Moreover, large hospitals may place more requirements on nurses to improve their expertise, and their educational background

TABLE 6 Correlations amongst participants' KAP sores ($N = 485$)

Items	τ_b	p
Knowledge vs. Attitude	0.063	.055
Knowledge vs. Practice	0.120	<.001[*]
Attitude vs. Practice	0.223	<.001[*]

[*]$p < .01$; there were significant differences between the correlations.

could impact their attitudes (Du et al., 2021). These previous studies support our research results.

Finally, Kendall's tau-b correlation analysis was used to identify correlations amongst participants' KAP scores. A previous study indicated that knowledge is a prerequisite for prevention beliefs, positive attitudes and promoting positive practices (Wahlen et al., 2020). The present study found a weak positive correlation between nurses' knowledge and practice and a moderate positive correlation between their attitude and practice scores. This study indicates that improving ICU quasi-specialty nurses' knowledge of and attitudes towards EM could positively impact EM practices. Therefore, nurse managers should focus on enhancing ICU quasi-specialty nurses' knowledge of and attitudes towards EM to strengthen its implementation.

4.1 | Limitations

This study has some limitations. First, this study enrolled participants from only Guizhou Province, limiting its generalization to other locations. Thus, studies with ICU quasi-specialty nurses from other sites are needed. Second, the study adopted a self-report data collection method, which may have impacted its accuracy in relation to participants' overestimations or underestimations. However, the researchers explained the survey approach to the participants to reduce their bias. Third, we did not analyse predictors due to the non-normal distribution of the KAP scores. Thus, further studies are needed to explore the predictors of ICU quasi-specialty nurses' KAP for EM.

4.2 | Conclusion

This study enhanced the literature body of EM- associated KAP, and the findings help to provide a better understanding of the strengths and weaknesses in relation to early mobilization amongst ICU nurses enrolled in specialty training programmes. First, the results demonstrated that ICU quasi-specialty nurses held generally positive attitudes towards EM; however, their EM knowledge and practices showed a need for improvement, especially knowledge related to EM scope, implementation indicators, and practices associated with out-of-bed mobilization. Second, this study found that training, EM

implementation culture, educational background and hospital levels might impact ICU quasi-specialty nurses' KAP scores. Last, this study showed positive correlations between nurses' knowledge and practice and attitudes and practices, highlighting that improving ICU quasi-specialty nurses' knowledge and attitudes could positively affect their EM practices.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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