Clinicians' knowledge and attitude towards early mobilization in intensive care units in Ethiopian tertiary hospitals: A multi-centre study

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Abstract

Objectives: To assess clinicians' knowledge, attitude and associated factors towards patients' early mobilization in intensive care units in the tertiary hospitals in Northwest Ethiopia.

Methods: A multi-centre, cross-sectional study was conducted at the tertiary hospitals in Northwest Ethiopia from April to June, 2022. Data were collected by using self-administered, structured questionnaire; ordinal logistic regression analysis was performed and associations were described in adjusted odds ratios.

Results: A total of 304 clinicians were included (response rate of 89.7%). The proportions of poor, fair and good knowledge towards early mobilization in intensive care unit among clinicians were 16.8%, 57.9% and 25.3%, respectively; while that of negative, fair and positive attitude were 16.4%, 60.2% and 23.4%, respectively. Factors associated with better knowledge were being a physiotherapist (adjusted odds ratio = 2.9, confidence interval = 1.2–6.7), having a total work experience >5 years (adjusted odds ratio = 4.6, confidence interval = 1.7–12.1), having an intensive care unit work experience >5 years (adjusted odds ratio = 2.8, confidence interval = 1.1–6.8), previous in-service training (adjusted odds ratio = 1.8, confidence interval = 1.1–3.0) and reading guidelines (adjusted odds ratio = 1.9, confidence interval = 1.1–3.2). Better attitude was associated with in-service training (adjusted odds ratio = 1.9, confidence interval = 1.2–3.1), attending early mobilization courses (adjusted odds ratio = 1.8, confidence interval = 1.1–3.0), presence of mobilization advocators (adjusted odds ratio = 1.7, confidence interval = 1.0–2.8), good knowledge (adjusted odds ratio = 2.6, confidence interval = 1.2–5.8) and fair knowledge (adjusted odds ratio = 2.5, confidence interval = 1.3–4.8).

Conclusion: Most of the clinicians had demonstrated fair knowledge and attitude towards early mobilization in intensive care unit. However, there were significant proportion of clinicians who had poor knowledge and negative attitude. We recommended active engagement of physiotherapists and experienced clinicians in intensive care units. Clinicians need to have self-learning habits and attend regular training/courses related to early mobilization in intensive care unit.

Introduction

Early mobilization needs interdisciplinary team approach from active range of motion to full range of ambulation.[1] It starts as early as the first or second day of admission to intensive care unit (ICU) and involves timely progression through a series of simple activities to full ambulation.[2] It is classified into passive and active mobilization. Passive mobilization

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usually includes patients changing different positions, suctioning by physiotherapist and changing diapers.[3] Active mobilization includes ambulation and physical exercises with or without assistance.[4–6]

Prolonged immobilization is independently associated with serious complications such as pressure ulcers, pneumonia, deep vein thrombosis, delirium and ICU-acquired weakness.[7–9] Early mobilization was found to improve physical and cognitive functions, decrease mechanical ventilation time, ICU and total hospital stay and overall healthcare cost.[10,11]

Early mobilization is a safe and feasible intervention that results in physiological and functional improvements in ICU. Despite its benefits, early mobilization is not widely implemented in ICUs. The rate of early mobilization was 19.2% in mechanically ventilated patients and 23.5% in non-mechanically ventilated patients.[12] Previous studies documented that only 37% and 24% of ICU patients had bedside mobilization.[13,14] Commonly reported perceived barriers to early mobilization in ICU were lack of mobilization protocol, inadequate training and knowledge and negative attitude and culture among ICU clinicians.[15–19] There was limited research-based evidence on early mobilization in ICU in low-income countries. Therefore, the objective of this study was to assess clinicians' knowledge and attitude and associated factors towards patients' early mobilization in ICUs in tertiary hospitals in Northwest Ethiopia.

Methods

Study design, period, and area

A multi-centre cross-sectional census was conducted from April 2 to June 20, 2022 at five tertiary hospitals in Northwest Ethiopia: University of Gondar Comprehensive Specialized Hospital (UOGCSH) at Gondar town, Tibebe Ghion Comprehensive Specialized Hospital (TGCSH) in Bahirdar city, Felege Hiwot Comprehensive Specialized Hospital (FHCSH) in Bahirdar city, Debre Markos Comprehensive Specialized Hospital (DMCSH) at Debre Markos town and Debre Tabor Comprehensive Specialized Hospital (DTCSH) at Debre Tabor town.

This study included all physicians, anaesthetists, nurses and physiotherapists who were working in adult surgical and medical ICUs at the five tertiary hospitals in Northwest Ethiopia during the study period; 339 ICU clinicians were working:135 at UOGCSH, 58 at TGCSH, 46 at FHCSH, 58 at DMCSH and 42 at DTCSH. UOGCSH and DTCSH had two ICUs (one medical and one surgical), whereas FHCSH, TGCSH and DMCSH had one mixed medical–surgical ICU. All except students, volunteers and clinicians on leave were excluded from this study.

Variables and operational definitions

The outcome variables were knowledge and attitude towards early mobilization. The independent variables were sociodemographic factors, work-related factors and ICU setting-related factors.

We define early mobilization as a range of bodily movements carried out by healthcare provider as part of care for patients admitted to ICU, which may include active or passive movements.[20]

Knowledge: According to Bloom's cutoff points, scores between 80% and 100% (11–13 out of 13) were considered as good, scores between 60% and 79% (8–10 out of 13) were considered as fair and scores below 60% (≤7 out of 13) were considered as poor.[21–23]

Attitude: According to Bloom's cutoff points, scores between 80% and 100% (48–60 out of 60) were considered as positive, scores between 60% and 79% (36–47 out of 60) were considered as fair and scores below 60% (≤35 out of 60) were considered as negative.[21–23]

Data collection tools and procedure

Ethical approval was obtained from the Ethical Review Committee of School of Medicine, University of Gondar and official permission was obtained from each hospital administration. Written informed consent was obtained from each study participant and confidentiality was ensured. Data were collected with an English version of structured, self-administered questionnaire which was validated and its internal consistency was reported as 0.9.[21,24] The knowledge domain contained 13 YES or NO questions to assess health professional's levels of knowledge regarding early mobilization in ICU. Within the knowledge domain, the participants responded to any choices they thought might be correct. Each correct answer was scored as 1, and each incorrect answer was scored as 0. Thus, the total score of knowledge for each study participant ranged from 0 to 13, and a higher score indicated good knowledge. The attitude domain contained 12 questions which were measured by a five-point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree). A negative question was scored in the reverse direction. Each question or item was scored, and the final attitude score ranged between a minimum of 12 and a maximum of 60.

Statistical analysis

The data were entered by EpiData version 4.6 and exported to SPSS version 26 (IBM Corporation, New York, USA) for analysis. Descriptive and ordinal logistic regression analyses were performed to determine associations. Independent variables with p-values < 0.2 in bivariate regression analysis were entered in the final multivariate regression analysis.

Table 1. Sociodemographic characteristics of ICU clinicians (*N* = 304).

Variables	Frequency (*n*)	Percentage (%)
Age (years)		
25–29	145	47.7
30–34	105	34.5
≥35	54	17.8
Sex		
Male	241	79.3
Female	63	20.7
Profession		
Physician	82	27.0
Anaesthetist	80	26.0
Physiotherapist	38	12.5
Nurse	104	34.2
Education level		
Bachelor's degree	152	50.0
Master's degree	92	30.3
Resident and specialist	60	19.7
Total work experience (year)		
<2	54	17.8
2–5	108	35.5
>5	142	46.7
ICU work experience (year)		
<2	165	54.3
2–5	108	35.5
>5	31	10.2

Table 2. Work and ICU-related characteristics of ICU clinicians (*N* = 304).

Variable	Frequency (*n*)	Percentage (%)
Number of ICU beds		
1–10	154	50.7
>10	150	49.3
ICU working type		
Medical ICU	78	25.7
Surgical ICU	47	15.5
Mixed medical–surgical ICU	179	58.9
Early mobilization protocol implemented		
Yes	190	62.5
No	114	37.5
Received in-service training on early mobilization		
Yes	125	41.1
No	179	58.9
Received pre-service course on early mobilization		
Yes	186	61.2
No	118	38.8
Read guidelines/literatures on early mobilization		
Yes	174	57.2
No	130	42.8
Early mobilization advocator within the ICU		
Yes	150	49.3
No	154	50.7
Previous experience with early mobilization in ICU		
Yes	142	46.7
No	162	53.3

Independent variables with a *p*-value < 0.05 in the final model were considered statistically significant and the strength of association was shown in adjusted odds ratio (AOR) at 95% confidence interval (CI).

Results

Sociodemographic characteristics

A total of 304 clinicians were included in this study with a response rate of 89.7%. Of the total, 82 (27.0%) were physicians, 80 (26.0%) were anaesthetists, 104 (34.2%) were nurses and 38 (12.5%) were physiotherapists. The median age of the clinicians was 29 years (interquartile range (IQR) = 27–33) (Table 1).

Work and ICU-related characteristics

More than half of the clinicians (179, 58.9%) were working in mixed medical–surgical ICUs. The majority (179, 58.9%) did not take any in-service training related to early mobilization. One hundred and eighty-six (61.2%) clinicians had attended a course related to early mobilization during pre-service education. One hundred and seventy-four (57.2%) clinicians had the experience of self-reading of guidelines/literature related to early mobilization in ICU while 162

(53.3%) had no previous experience with early mobilization in ICU (Table 2).

Knowledge on early mobilization in ICU

Of the total, 51 (16.8%) had poor knowledge (CI = 12.8–21.4), 176 (57.9%) had fair knowledge (CI = 52.6–63.5) and 77 (25.3%) had good knowledge (CI = 20.4–30.6) on early mobilization in ICU. The median knowledge score was 9.0 (IQR = 8.0–10.8). The minimum and maximum scores were 4 and 13, respectively. The knowledge levels differ across professions as 18 (22.0%) physicians, 21 (26.3%) anaesthetists, 21 (20.2%) nurses and 17 (44.7%) physiotherapists had good knowledge (Figure 1). The knowledge levels differ across each institution, 26.2% in UOGCSH, 17.3% in TGCSH, 11.9% in FHCSH, 36.8% in DMCSH and 32.3% in DTCSH had good knowledge (Figure 2).

The question that had the highest rate of correct answers (284, 93.4%) was 'early mobilization practice can improve patients' respiratory function', followed by the question 'the term "mobilization" refers to physical activity of sufficient intensity to produce physiological effects such as increased blood circulation' (270, 88.8%). The least correctly answered question was 'the range of motion exercise (active or
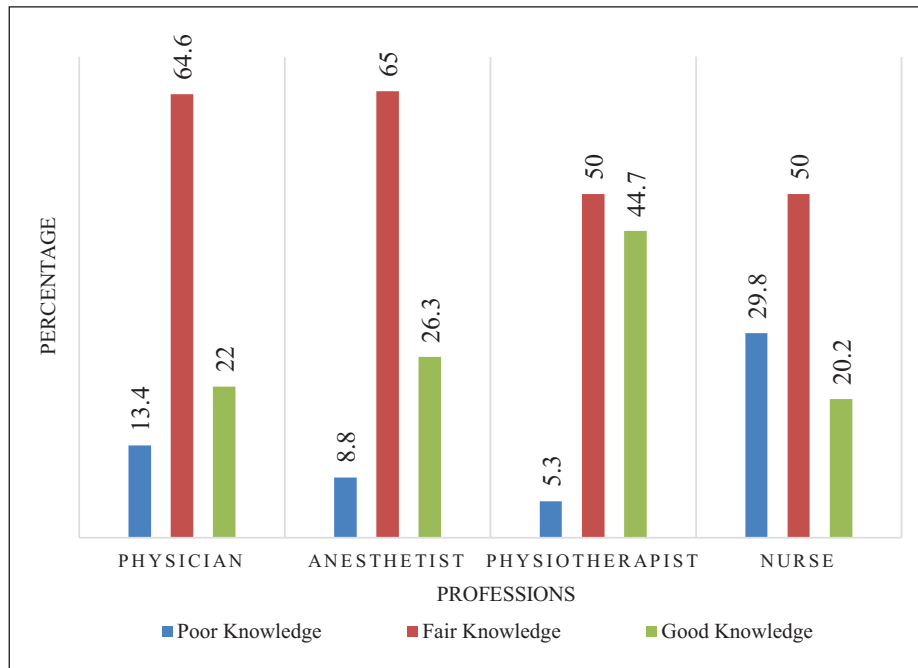
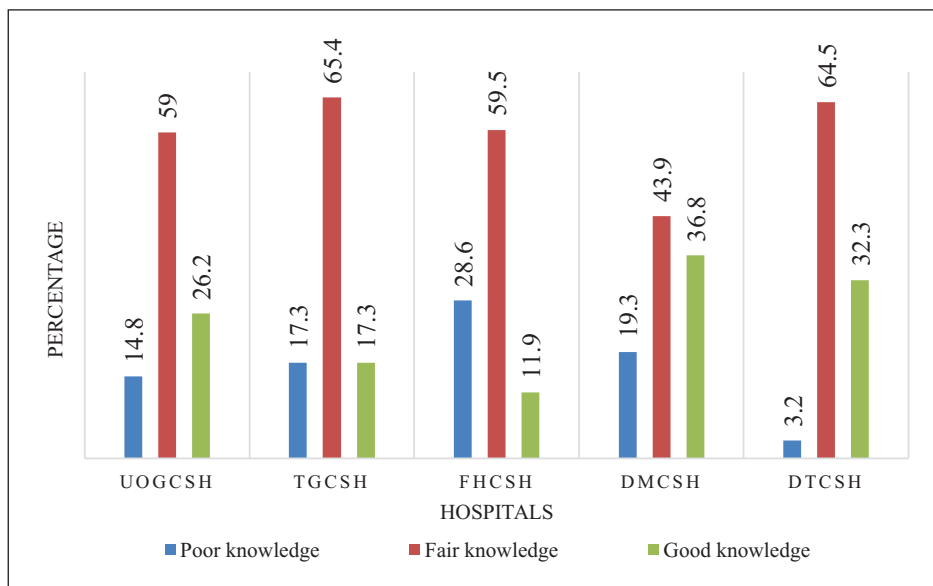**Figure 1.** Knowledge of clinicians among professions (*N* = 304).

Figure 2. Knowledge of clinicians among hospitals (*N* = 304).

passive) is sufficient to maintain muscle strength in critically ill patients' (103, 33.9%), followed by the question 'early mobilization refers to active rehabilitation and passive exercise that are limited in bed' (111, 36.5%) (Table 3).

The likelihood of physiotherapists to have better knowledge was three times higher than that of nurses (AOR = 2.9, CI = 1.2–6.7). Clinicians who had total work experience >5 years were found to be five times more knowledgeable

than those who had <2 years of experience (AOR = 4.6, CI = 1.7–12.1). Furthermore, the odds of having better knowledge were four times higher among clinicians who had a total work experience of 2–5 years than those who had <2 years of exposure (AOR = 4.1, CI = 1.7–9.9). Similarly, clinicians who had ICU work experience of >5 years were found to have three times better knowledge than those who had <2 year of ICU work experience (AOR = 2.8, CI = 1.1–6.8).

Table 3. Responses to knowledge questions by ICU clinicians (*N* = 304).

Knowledge questions	Correct answer *n* (%)	Wrong answer *n* (%)
Patient's EM practice should follow the principle of step by step according to the patient's condition, starting from passive activities, gradually transitioning to active activities (Yes)	261 (85.9)	43 (14.1)
Early mobilization practice can improve patients' respiratory function (Yes)	284 (93.4)	20 (6.6)
Implementing early mobilization for ICU patients can reduce the incidence of ICU acquired weakness (Yes)	261 (85.9)	43 (14.1)
The term 'mobilization' refers to physical activity of sufficient intensity to produce physiological effects such as increased blood circulation, increased perfusion, ventilation, metabolism and alertness of the central and surrounding tissues and organs (Yes)	270 (88.8)	34 (11.2)
Early mobilization of intubated and mechanically ventilated patients decreases length of ICU stay (Yes)	260 (85.5)	44 (14.5)
Early mobilization of mechanically ventilated patients reduces duration of mechanical ventilation (Yes)	247 (81.3)	57 (18.8)
It is possible to mobilize a patient receiving mechanical ventilation on a low dose of vasopressors and/or inotropic agents (Yes)	197 (64.8)	107 (35.2)
Early means 'the earlier the better' (Yes)	266 (87.5)	38 (12.5)
Early mobilization refers to active rehabilitation and passive exercise that are limited in bed (No)	111 (36.5)	193 (63.5)
Early mobilization is a part of ABCDE bundle (Awaking, Breathing, Coordinate, Delirium Monitoring, and Early Mobilization) (Yes)	239 (78.6)	65 (21.4)
Out of bed mobilization is safe for mechanically ventilated patients (Yes)	136 (44.7)	168 (55.3)
Early mobilization in ICU patients is associated with increase in the incidence and severity of delirium (Yes)	174 (57.2)	130 (42.8)
Range of motion exercise (active or passive) is sufficient to maintain muscle strength in critically ill patients (No)	103 (33.9)	201 (66.1)

ABCDE: Airway, Breathing, Circulation, Disability, Exposure; EM: Early Mobilization; ICU: intensive care unit.

Clinicians who had taken in-service training were twice more knowledgeable (AOR = 1.8, CI = 1.1–3.0). In addition, those who had attended a course related to early mobilization during pre-service education were twice more knowledgeable (AOR = 2.1, CI = 1.2–3.6). Similarly, those who have the experience of self-reading of guidelines/literatures related to early mobilization were twice more knowledgeable (AOR = 1.9, CI = 1.1–3.2).

The odds of having better knowledge among clinicians who had positive and fair attitude were 3.3 (AOR = 3.3, CI = 1.4–8.0) and 3.2 (AOR = 3.2, CI = 1.5–6.9), respectively (Table 4).

Attitude towards early mobilization in ICU

Of the total, 50 (16.4%) had negative attitude (CI = 12.5–20.7), 183 (60.2%) had fair attitude (CI = 54.3–66.1) and 71 (23.4%) had positive attitude (CI = 19.1–28.6). The median (IQR) attitude score was 44 (39–47). The minimum and maximum attitude scores were 20 and 60, respectively. When comparing professionals, 21 (25.6%) physicians, 23 (28.7%) anaesthetists, 18 (17.3%) nurses and 9 (23.7%) physiotherapists were found to have positive attitude (Figure 3). The attitude levels differ across each institution, 24.6% in UOGCSH, 25% in TGCSH, 19% in FHCSH, 24.6% in DMCSH and 38.7% in DTCSH had positive attitude (Figure 4).

The majority of the clinicians (157, 51.6%) had agreed that early mobilization should be regarded as a routine care

in ICU and 125 (41.1%) had strongly agreed that receiving in-service training related to early mobilization is necessary for critical care ICU clinicians (Table 5).

The odds of having better attitude among clinicians who had received pre-service course and in-service training related to early mobilization were nearly two times more than those who had not (AOR = 1.8, CI = 1.1–3.0) and (AOR = 1.9, CI = 1.2–3.1). Moreover, clinicians who were working in ICUs that had mobilization advocator were nearly twice knowledgeable (AOR = 1.7, CI = 1.0–2.8).

Clinicians who had good and fair knowledge were found to have better attitude (AOR = 2.6, CI = 1.2–5.8) and (AOR = 2.5, CI = 1.3–4.8) than those who have poor level of knowledge, respectively (Table 6).

Discussion

Early mobilization is essential for physiological and functional recovery. Despite its benefits, early mobilization is not widely implemented in ICUs.[12] This survey study was conducted with a total of 304 study subjects to determine the level of knowledge and attitude and associated factors among health professionals working in ICU towards patients' early mobilization. Our study showed that the proportions of poor, fair and good knowledge on early mobilization were 16.8%, 57.9% and 25.3%, respectively. The proportion of good knowledge was lower compared to that of previous studies which reported that the proportion of

Table 4. Ordinal logistic regression model: knowledge of clinicians on early mobilization (*N* = 304).

Variables	Knowledge level			Odds ratio (95% CI)		*p*-Value
	Poor *n* (%)	Fair *n* (%)	Good *n* (%)	Crude	Adjusted	
Profession						
Physician	11 (13.4)	53 (64.6)	18 (22.0)	1.8 (1.0–3.2)	1.4 (0.6–3.3)	0.511
Anaesthetist	7 (8.8)	52 (65.0)	21 (26.3)	2.4 (1.3–4.2)	1.3 (0.6–2.6)	0.456
Physiotherapist	1 (2.6)	19 (50.0)	18 (47.4)	4.7 (2.2–10.0)	2.9 (1.2–6.7)	**0.016**
Nurse	32 (30.8)	52 (50.0)	20 (19.2)	1	1	
Level of education						
Resident and specialist	7 (11.7)	41 (68.3)	12 (20.0)	2.6 (0.4–15.2)	2.5 (0.3–19.4)	0.396
Master	7 (7.6)	54 (58.7)	31 (33.7)	4.4 (0.8–25.6)	2.7 (0.4–17.3)	0.299
Degree	35 (23.8)	79 (53.7)	33 (24.4)	1.9 (0.3–10.9)	2.6 (0.4–1 6.3)	0.322
Diploma	2 (40.0)	2 (40.0)	1 (20.0)	1	1	
Total work experience (years)						
>5	22 (15.5)	79 (55.6)	41 (28.9)	4.1 (1.9–9.0)	4.6 (1.7–12.1)	**0.002**
2–5	15 (13.9)	68 (63.0)	25 (23.1)	3.9 (1.8–8.6)	4.1 (1.7–9.9)	**0.001**
<2	14 (25.9)	29 (53.7)	11 (20.4)	1	1	
ICU work experience (years)						
>5	2 (6.5)	13 (41.9)	16 (51.6)	4.0 (1.9–8.6)	2.8 (1.1–6.8)	**0.026**
2–5	15 (13.9)	68 (63.0)	25 (23.1)	1.3 (0.8–2.1)	1.1 (0.6–1.9)	0.756
<2	34 (21.4)	89 (56.0)	36 (22.6)	1	1	
Received in-service training related to early mobilization						
Yes	14 (11.2)	66 (52.8)	45 (36.0)	2.4 (1.5–3.8)	1.8 (1.1–3.0)	**0.03**
No	37 (20.7)	110 (61.5)	32 (17.9)	1	1	
Received pre-service course related to early mobilization						
Yes	20 (10.8)	103 (55.4)	63 (33.9)	3.4 (2.1–5.5)	2.1 (1.2–3.6)	**0.008**
No	31 (26.3)	73 (61.9)	14 (11.9)	1	1	
Read guidelines/literature related to early mobilization						
Yes	21 (12.1)	93 (53.4)	60 (34.5)	2.8 (1.8–4.5)	1.9 (1.1–3.2)	**0.023**
No	30 (23.1)	83 (63.8)	17 (13.1)	1	1	
Early mobilization advocator within the ICU						
Yes	23 (15.3)	77 (51.3)	50 (33.3)	1.8 (1.2–2.8)	0.9 (0.5–1.5)	0.570
No	28 (18.2)	99 (64.3)	27 (17.5)	1	1	
Prior experience with early mobilization in ICU						
Yes	23 (16.2)	69 (48.6)	50 (35.2)	1.9 (1.2–3.0)	1.4 (0.8–2.4)	0.201
No	28 (17.3)	107 (66.0)	27 (16.7)	1	1	
Attitude level						
Positive	5 (7.0)	43 (60.6)	23 (32.4)	5.4 (2.6–11.3)	3.3 (1.4–8.0)	**0.007**
Fair	27 (14.8)	107 (58.5)	49 (26.8)	3.6 (1.9–6.9)	3.2 (1.5–6.9)	**0.002**
Negative	19 (38.0)	26 (52.0)	5 (10.0)	1	1	

CI: confidence interval; ICU: intensive care unit.
Bold values are statistically significant.

good knowledge was 66%, 61.7%, 58.2% and 50%.[19,24–26] Another study has reported 41% poor, 19% fair and 40% good knowledge.[16] However, higher proportion of poor knowledge (59.8% and 34.8%) was also reported.[2,27] The proportion of good knowledge was relatively high compared to a previous study that reported 45.2% poor knowledge, 52.3% fair knowledge and 2.5% good knowledge.[21] The possible reasons for the lower proportion of good knowledge in our study might be pre-service and in-service training, measurement tools and composition of study participants in-terms of profession.

Physiotherapists were three times more likely to have good knowledge as compared to nurses. Supporting our finding, previous studies have reported that physiotherapists demonstrated good knowledge on early mobilization and its benefits,[19,28] and might be explained by the nature of the profession as physiotherapy focuses on physical activities.

We found that longer total work experience and ICU work experience were associated with good knowledge which is consistent with previous studies,[19,29–32] and might be justified by knowledge acquired through experience and the possibility
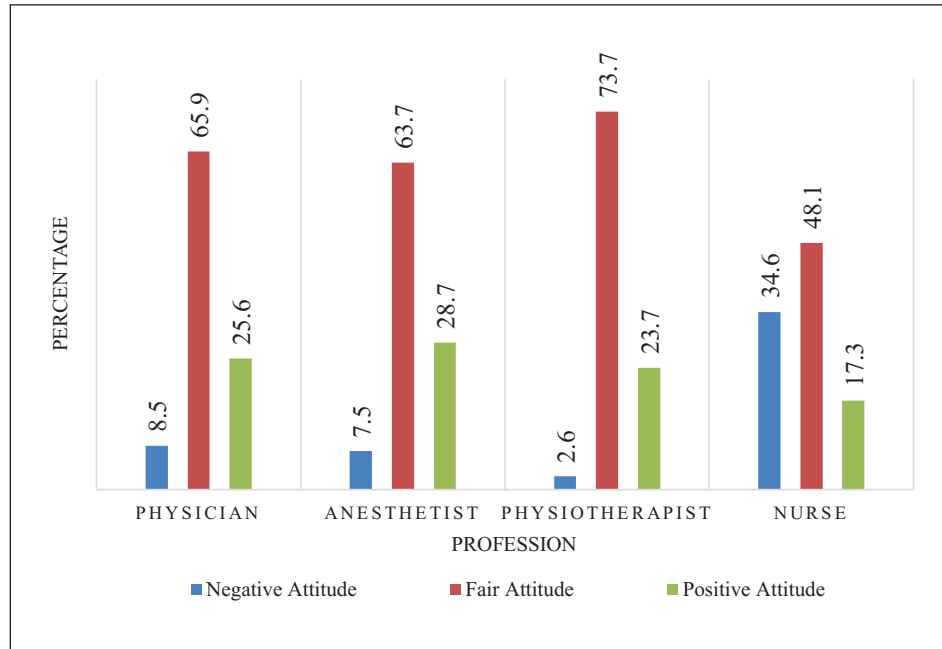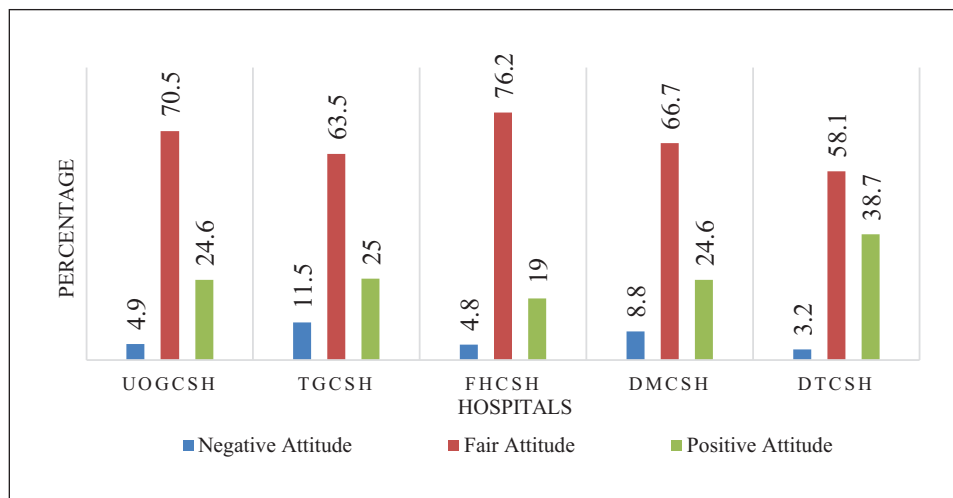
Figure 3. Attitude of clinicians among professions (*N* = 304).

Figure 4. Attitude of clinicians among hospitals (*N* = 304).

of senior clinicians to have further education training.[33] However, knowledge may fade as time elapsed, especially, in over 10 years.[25,28]

Taking pre-service courses or in-service training related to early mobilization have doubled the odds of having better knowledge. We found that this finding is consistent with previous reports.[21,31–36]. Furthermore, clinicians who have the experience of self-reading of guidelines/literature related to early mobilization in ICU were found two times more knowledgeable; and it is comparable to a previous study.[19]

Knowledge and attitude are usually interdependent. Our study demonstrated that clinicians who had positive or fair attitude were three times more knowledgeable on early mobilization in ICU and this finding is supporting a previous study.[19]

Over 60% of respondents had shown positive attitude to early mobilization in previous studies.[25,28] In this study, the proportions of positive, fair and negative attitude towards early mobilization were 23.4%, 60.2% and 16.4%, respectively. Comparably, a previous study has reported 31.4% positive, 60.7% fair and 7.8% negative attitude.[21] However, the proportion of positive attitude was lower than that of a previous study which reported 72%, 61.7% and 87.4% of clinicians had positive attitude towards early mobilization.[18,25,37]

Table 5. Responses to attitude questions by ICU clinicians ($N = 304$).

Attitude questions	Clinician's response to attitude questions, n (%)				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I would agree to mobilization of a patient on mechanical ventilation	18 (5.9)	80 (26.3)	52 (17.1)	104 (34.2)	50 (16.4)
Overall, staffing is adequate to mobilize patients receiving mechanical ventilation	25 (8.2)	87 (28.6)	53 (17.4)	108 (35.5)	31 (10.2)
Mobilization of ICU patients should occur automatically via a nursing and physiotherapy protocol unless the physician specifically orders otherwise	24 (7.9)	50 (16.4)	69 (22.7)	127 (41.8)	34 (11.2)
I would agree to mobilize a mechanically ventilated patient on a low dose of vasopressors and/or inotropic agents	14 (4.6)	72 (23.7)	75 (24.7)	121 (39.8)	22 (7.2)
The patient risk associated with mobilizing intubated patients outweighs the benefits	24 (7.9)	96 (31.6)	67 (22.0)	96 (31.6)	21 (6.9)
I have enough time to help mobilize a patient receiving mechanical ventilation once per day	28 (9.2)	69 (22.7)	59 (19.4)	124 (40.8)	24 (7.9)
I would be willing to decrease sedation to facilitate mobilization of my intubated and ventilated patients	14 (4.6)	35 (11.5)	65 (21.4)	144 (47.4)	46 (15.1)
Within my scope of practice, I would be willing to alter the mechanical ventilation settings of my ICU patients to facilitate mobilization	16 (5.3)	36 (11.8)	45 (14.8)	144 (47.4)	63 (20.7)
Receiving professional education and training about early mobilization are necessary for critical care clinicians in ICU	9 (3.0)	23 (7.6)	23 (7.6)	124 (40.8)	125 (41.1)
I agree that early mobilization is beneficial to improve the prognosis of ICU patients	8 (2.6)	24 (7.9)	23 (7.6)	140 (46.1)	109 (35.9)
I agree that critical care clinicians should master the early mobilization-related knowledge	9 (3.0)	20 (6.6)	23 (7.6)	154 (50.7)	98 (32.2)
Early mobilization of critically ill patients should be regarded as a routine care in ICU	9 (3.0)	19 (6.3)	28 (9.2)	157 (51.6)	91 (29.9)

ICU: intensive care unit.

Table 6. Ordinal logistic regression: attitude towards early mobilization (*N*=304).

Variables	Attitude level			Odds ratio (95% CI)		*p*-Value
	Negative *n* (%)	Fair *n* (%)	Positive *n* (%)	Crude	Adjusted	
Sex						
Male	33 (13.7)	146 (60.6)	62 (25.7)	2.2 (1.3–3.9)	1.7 (0.9–3.1)	0.092
Female	17 (27.0)	37 (58.7)	9 (14.3)	1	1	
Level of education						
Residence and specialist	3 (5.0)	41 (68.3)	16 (26.7)	4.1 (0.7–25.3)	1.8 (0.3–12.4)	0.570
Master	10 (10.9)	51 (55.4)	31 (33.7)	4.5 (0.8–27.0)	1.7 (0.2–11.4)	0.606
Degree	35 (23.8)	89 (60.5)	23 (15.6)	1.6 (0.3–9.3)	0.9 (0.1–5.6)	0.873
Diploma	2 (40.0)	2 (40.0)	1 (20.0)	1	1	
Numbers of ICU beds						
>10	32 (21.3)	85 (56.9)	33 (22.0)	0.7 (0.4–1.1)	0.8 (0.5–1.3)	0.371
1–10	18 (11.7)	98 (63.6)	38 (24.7)	1	1	
Early mobilization protocol implemented in ICUs						
Yes	32 (16.8)	119 (62.6)	39 (20.5)	0.8 (0.5–1.2)	0.7 (0.4–1.0)	0.094
No	18 (15.8)	64 (56.1)	32 (28.1)	1	1	
Received training related to early mobilization						
Yes	14 (11.2)	67 (53.6)	44 (35.2)	2.6 (1.6–4.2)	1.9 (1.2–3.1)	**0.012**
No	36 (20.1)	116 (64.8)	27 (15.1)	1	1	
Received early mobilization-related course education						
Yes	21 (11.3)	109 (58.6)	56 (30.1)	2.8 (1.7–4 .5)	1.8 (1.1–3.0)	**0.031**
No	29 (24.6)	74 (62.7)	15 (12.7)	1	1	
Early mobilization advocator within the ICUs						
Yes	17 (11.3)	87 (58.0)	46 (30.7)	2.2 (1.4–3.5)	1.7 (1.1–2.9)	**0.028**
No	33 (21.4)	96 (62.3)	25 (154)	1	1	
Knowledge level						
Good	5 (6.5)	49 (63.6)	23 (29.9)	5.3 (2.6–11.1)	2.6 (1.2–5.8)	**0.015**
Fair	26 (14.8)	107 (60.8)	43 (24.4)	3.5 (1.8–6.6)	2.5 (1.3–4.8)	**0.008**
Poor	19 (37.3)	27 (52.9)	5 (9.8)	1	1	

CI: confidence interval; ICU: intensive care unit.
Bold values are statistically significant.

Clinicians who had received pre-service course or in-service training related to early mobilization were found twice more likely to have better attitude which is consistent with previous studies.[21,34,36,38]

The presence of early mobilization advocator/champion in ICU has doubled the odds of better attitude among clinicians. Early mobilization advocators in ICU may help to build positive attitude and motivation.[2]

Clinicians who had good and fair knowledge were found to have better attitude towards early mobilization. Knowledge is known to guide behavioural changes and our finding is consistent with the other studies.[19,25,39]

The limitations in this study were inability to determine cause–effect temporal relationships, study was exposed to social desirability bias as respondents may overreport their attitudes and relative weakness of 'YES or NO' questions to accurately assess knowledge compared to multiple choice questions. We included all healthcare professionals who were working in ICU, without power analysis of sample size calculation due to limited number of clinicians working in

the ICUs. For future researchers, we would like to recommend to study the practice of early mobilization in ICU.

Conclusion

The majority of clinicians had fair knowledge and attitude towards early mobilization in ICU. However, there were still significant proportion of clinicians who had poor knowledge and negative attitude. Being a physiotherapist, total work experience >5 years, ICU work experience >5 years, training and education on early mobilization, self-reading guidelines/literatures and having positive attitude were significantly associated with good knowledge of health professionals. Similarly, training and education on early mobilization, presence of early mobilization advocator within the ICU and having good knowledge were significantly associated with positive attitude of health professionals towards early mobilization in ICU. Therefore, we recommended active engagement of physiotherapists and experienced clinicians in ICUs. We also urge clinicians to have self-learning

habits and hospital administrators to prepare regular training and courses related to early mobilization in ICU. We have also demonstrated interdependence between knowledge and attitude.

Author contributions

TKD has conceptualized the study and objectives and developed the proposal. YWB, WBC and SYM criticized the proposal. All authors had participated in data management and statistical analyses. YBW and TKD have prepared the final article. All authors read and approved the final article.

Availability of data and materials

Data and materials used in this study are available and can be presented by the corresponding author upon reasonable request.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethics approval and consent to participate

Ethical approval was obtained from the Ethical Review Committee of School of Medicine, University of Gondar (approval number: SOM/1404/2022); and official permission was obtained from each hospital administration. Written informed consent was obtained from every participant after a brief explanation. Confidentiality was ensured by removing identifiers and locking the questionnaires after data collection in a secured area.

Informed consent

Written informed consent was obtained from all subjects before the study.

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Supplemental material

Supplemental material for this article is available online.

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