Early mobilisation practices in Windhoek intensive care units: A retrospective review of patient profiles and physiotherapy practice

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Background. Early mobilisation (EM) is safe and feasible with positive patient outcomes in various settings. However, data from Namibia in southern Africa are lacking, and the status of intensive care unit (ICU)-based mobilisation is unknown.
Objectives. To describe the mobility practices and profiles of critically ill patients in ICUs in Windhoek, Namibia.
Methods. A retrospective, descriptive record review was conducted in two private hospitals in Windhoek. Data were extracted using a self-designed electronic data abstraction form. The primary outcomes were the profile of ICU patients and documented mobility practices. Secondary outcomes included the timing and frequency of mobilisation, physiotherapy techniques used, and adverse events during physiotherapy. Patients with incomplete datasets or illegible records were excluded.
Results. The review included charts of 870 adult patients admitted to the participating ICUs between January and December 2016. Patients were predominantly male (61.8%; *n*=538), with a mean (standard deviation (SD)) age of 56 (14.9) years. Most admissions were planned (66.3%; *n*=577), mainly for coronary angiograms (20.6%; *n*=179), cardiac conditions (13.0%; *n*=113) and cardiac surgery (10.3%; *n*=90). The mean (SD) length of ICU stay was 3.41 (3.3) days, and the mean duration of mechanical ventilation was 0.7 (2.1) days. The overall ICU mortality rate was 5.2% (*n*=45). Of the 870 patients, 352 (40.5%) received physiotherapy, with 345 of these (98.0%) being mobilised. The median (interquartile range) length of ICU stay for mobilised patients was 3 (2 - 5) days, compared with 2 (2 - 3) days for non-mobilised patients ($p<0.0001$). Adverse events during physiotherapy were rare, occurring in only 5 patients (1.4%).
Conclusion. EM is often implemented as part of physiotherapy practice in Windhoek ICUs; however, fewer than half of the patients in this study received physiotherapy, highlighting the need for improved implementation of EM protocols and screening for readiness to mobilise.

Keywords: Early mobilisation, critical illness, physiotherapy practice, patient outcomes.

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Contribution of the study
This study provides insights into intensive care unit (ICU) patient profiles and physiotherapy mobility practices in Windhoek, Namibia, demonstrating that early mobilisation is feasible and can be integrated into routine care. It highlights areas for improvement, including increasing physiotherapy referrals and implementing mobilisation screening. These findings can inform the development of more comprehensive, evidence-based ICU care protocols.

Advances in critical care science have significantly improved survival rates in critically ill patients. This progress has shifted focus to recognising and addressing the long-term consequences faced by survivors of critical illness.[1] Despite advances in medical technology and treatment protocols, intensive care unit (ICU)-acquired weakness (ICUAW) remains a significant challenge, affecting ~20 - 50% of critically ill patients.[2,3] ICUAW is characterised by a decline in muscle strength and functional capacity, often resulting from prolonged immobilisation and sedation.[3] ICUAW encompasses a range of conditions characterised by polyneuropathy and myopathy that develop after admission to the ICU.[4] This condition is linked to prolonged mechanical ventilation, increased ICU and hospital lengths of stay, and decreased health-related quality of life and increased mortality following hospital discharge.[5-7]

Early mobilisation (EM) has been proposed as a promising therapeutic intervention to counteract ICUAW, with studies suggesting that it can improve functional outcomes, reduce the duration of mechanical ventilation, and shorten ICU and hospital stays.[8-10] EM has been shown to be safe and feasible with positive patient outcomes in various settings,[11] but there are no data from Namibia in southern Africa, and current practice with regard to ICU-based mobilisation is unknown. In this study, EM was defined as physiotherapy-related rehabilitation started *within 48 hours* of admission to the ICU.[12]

Namibia, an upper middle-income country, operates a dual healthcare system, where the public sector serves most of the population (82%) and the private sector caters to the rest (18%).[13] Intensive care is largely centralised in Windhoek, with the two participating private hospitals offering 8 and 9 ICU beds, respectively.

This study aimed to describe the mobility practices and profiles of critically ill patients admitted to Windhoek ICUs. The primary objective was to conduct a retrospective record review to assess the current state of EM practices and identify factors influencing implementation of EM. By providing a comprehensive analysis of EM practices in Windhoek ICUs, the study sought to inform quality improvement initiatives and promote adherence to evidence-based EM protocols.

Methods

Study design and setting

A retrospective, descriptive record review was conducted to describe the ICU patient profile and documented mobility practices. The study was carried out in two privately funded hospitals in Windhoek, Namibia: Roman Catholic Hospital and Mediclinic Windhoek. The review included charts of 870 patients admitted between January and December 2016. The inclusion criteria were adult patients admitted to the ICU with a confirmed and documented admission diagnosis. Exclusion criteria included patients with incomplete data sets or illegible records.

Data collection and variables

Data were extracted using a self-designed electronic data abstraction form. The primary outcomes were the profile of ICU patients and the documented mobility practices. Secondary outcomes included the timing and frequency of mobilisation, physiotherapy techniques used, and adverse events during physiotherapy. Variables collected included demographic data (age, sex), admission details (source, type, timing), clinical data (diagnosis, ventilation status, mode of ventilation, length of ICU stay, duration of mechanical ventilation, ICU mortality) and physiotherapy practice details (techniques, timing, frequency, adverse events).

Statistical analysis

Descriptive statistics were used to summarise the profile of ICU patients and mobility practices. Continuous data were tested for normality using the Shapiro-Wilk test. Normally distributed data were presented as means and standard deviations (SDs), while non-parametric data were presented as medians and interquartile ranges (IQRs). Categorical data were summarised using frequencies and percentages. The Mann-Whitney *U*-test was used to compare the length of ICU stay between mobilised and non-mobilised patients. Yates-corrected χ^2 tests were used to assess the association between mobilisation and ICU mortality. Significance was accepted at $p<0.05$. Data analysis was performed using Statistica version 13 (StatSoft Inc., USA).

Ethical considerations

The study was conducted following ethical guidelines and received approval from the Human Research Ethics Committee of the University of Cape Town (ref. no. HREC REF 116/2018) and the Mediclinic Human Research Ethics Committee. Institutional approval was obtained from Roman Catholic Hospital and Mediclinic Windhoek.

Results

Study sample

A total of 870 patient records from two private hospitals in Windhoek were reviewed (Fig. 1). The demographic characteristics of the study sample are summarised in Table 1. Patients were predominantly male (61.8%; *n*=538), with a mean (SD) age of 56 (14.9) years (range 18 - 90 years). Most admissions were planned (66.3%; *n*=577), with the most common admission diagnoses being coronary angiography (20.6%; *n*=179), cardiac conditions (13.0%; *n*=113) and cardiac surgery (10.3%; *n*=90). The mean (SD) length of ICU stay was 3.41 (3.3) days (range 1 - 37 days), and the mean duration of mechanical ventilation was 0.7 (2.1) days (range 0 - 20 days). The overall ICU mortality rate was 5.2% (*n*=45).

Primary outcome: Mobility practices

The primary outcome was mobility practices in the ICU. Of the 870 patients, 352 (40.5%) received physiotherapy during their ICU stay. Of these, 345 (98.0%) were mobilised, with the majority (73.3%; *n*=253) being mobilised within 48 hours of ICU admission. The most common physiotherapy techniques were manual chest physiotherapy (57.4%; *n*=202), mobilisation to a chair (46.6%; *n*=164), and active range-of-motion exercises (35.2%; *n*=124) (Fig. 2). Techniques not recorded as being used included active cycle of breathing techniques, cycle ergometry, resisted exercises, and activities of daily living. The frequency of mobilisation was mainly once daily (78.6%; *n*=271), with a smaller proportion of patients receiving twice-daily sessions (20.9%; *n*=72).

Of the 166 patients who were invasively ventilated on admission to the ICU (Table 1), 122 (73.5%) were referred to physiotherapy and mobilised at various levels ranging from passive exercises and in-bed exercises to out-of-bed activities during their ICU stay. Most (63.9%; *n*=78) were mobilised within 48 hours of admission.

Secondary outcomes: Length of stay and mortality

The median (IQR) length of ICU stay was longer for patients who were mobilised: 3 (2 - 5) days compared with 2 (2 - 3) days for those who were not mobilised ($p<0.0001$). Of the 45 patients who died (5.2%), 8 (17.8%) had been mobilised in the ICU, compared with 337 (40.8%) of the patients who survived to ICU discharge (Yates-corrected $\chi^2=8.55$; $p=0.004$). However, the study was not designed to establish causality between mobilisation and mortality outcomes.

Adverse events and delirium monitoring

Adverse events during physiotherapy were rare, with only 5 patients (1.4%) experiencing significant changes in systolic blood pressure (<90 mmHg or >200 mmHg).

Discussion

This study aimed to describe the profile and mobility practices of critically ill patients in ICUs in Windhoek. The primary outcome was the profile of ICU patients and documented mobility practices, while secondary outcomes included the timing and frequency of mobilisation, physiotherapy techniques used, and adverse events during physiotherapy.

The Windhoek critical illness patient profiles are similar to those of well-resourced countries, with mostly male patients,[14,15] high planned admission rates[16] and low mobilisation-related adverse event rates.[17] Comparative patient demographic data from privately funded ICUs elsewhere in Africa are lacking. In government-funded ICUs from low- and low- to middle-income African countries such as Zimbabwe, Tanzania, Malawi and South Africa (SA), a younger cohort is reported,[18-20] with more unplanned/emergency admissions and high associated ICU mortality rates.[21-23] A recent African point prevalence study, which included mostly government-funded hospitals but also a small percentage that were privately funded, indicated a critical illness median age of 48 years.[24]

Mechanical ventilation requirements in the present study were low, and the average length of stay (LOS) in the ICU was short (3.41 days). Most patients (~95%) survived and were discharged from the ICU, regardless of whether they were mobilised or not. The short LOS and duration of mechanical ventilation as well as the high ICU survival

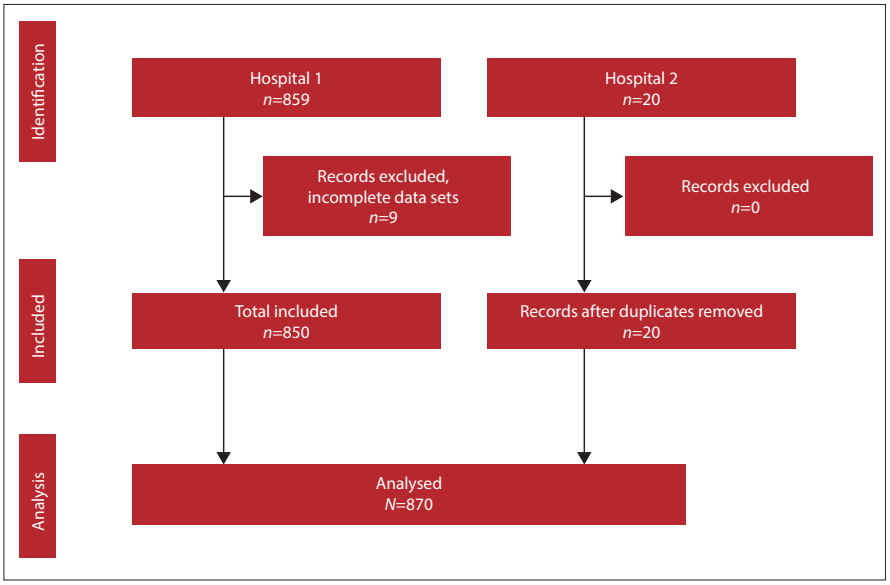

Fig. 1. Sample selection.

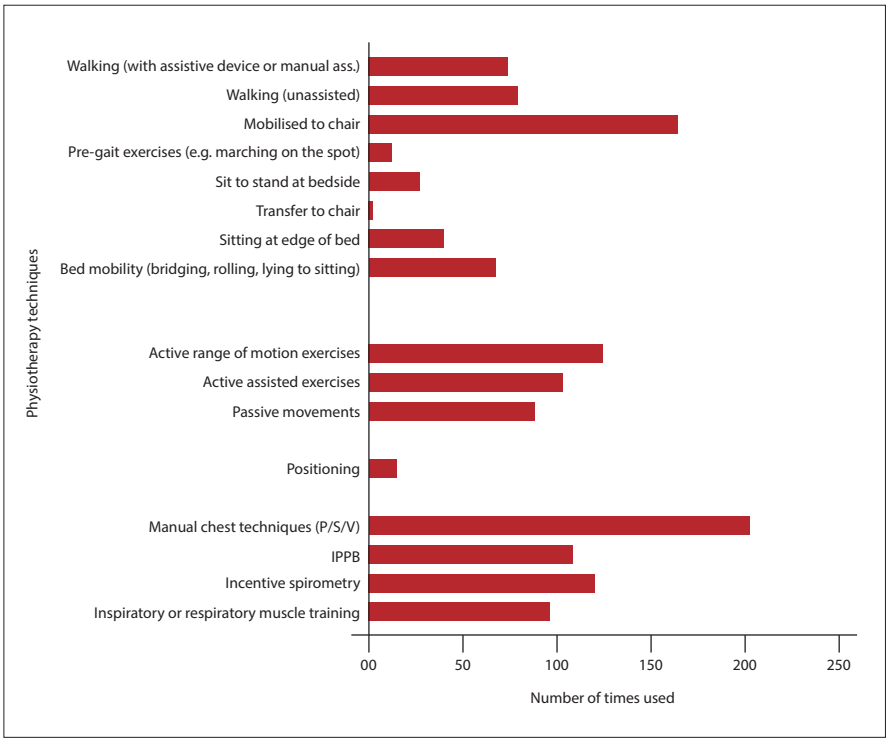

Fig. 2. Physiotherapy techniques received by patients while in the intensive care unit. (ass. = assistance; P/S/V = percussion/shaking/vibration; IPPB = intermittent positive-pressure breathing.)

rate may be attributed to the high number of planned cardiac and joint replacement admissions to these Windhoek ICUs. These cardiac patients typically require ventilation for less than a day after surgery, and they are usually discharged to the ward by the second or third day after surgery if no complications arise. Owing to the unique characteristics of the included Windhoek hospitals, correlation with published literature is limited. Neighbouring SA reported a similar mean ICU stay of 3 days,[22] although a longer ICU stay with a mean (SD) of 5 (7.3) days for planned surgical admissions and a longer stay of 8.2 (10.3) days for unplanned surgical admissions has also been reported.[21] However, these findings were from government-funded ICUs. SA has higher unplanned admissions, mortality and disease severity, which could influence LOS.[21,22,25]

A wide range of physiotherapy techniques was documented, with manual chest physiotherapy, mobilisation to a chair and active range-of-motion exercises being the most commonly used. These techniques are similar to those described in African and Australian studies, where mobilisation was a main focus, followed by exercise therapy, respiratory therapy, positioning, and techniques such as hyperinflation and suctioning.[18,26-28]

Although the present study found that a significant proportion of patients who received physiotherapy were mobilised within 48 hours of ICU admission, with low rates of adverse events, fewer than half (40.5%) of the total number of ICU patients received physiotherapy, and a quarter of ventilated patients were not referred to physiotherapy. This finding is particularly noteworthy, given the high proportion of planned post-surgical patients in this study, who may have different mobilisation needs compared with patients requiring prolonged ventilation. The high reported mobilisation during physiotherapy aligns with existing literature that emphasises the importance of EM in improving patient outcomes, such as reducing ICUAW and improving functional capacity.[3,9,29] However, the study also highlighted a gap in that the majority of ICU patients did not receive physiotherapy and were not mobilised while in the ICU. This finding highlights the need for systematic screening of patients for mobilisation readiness by physiotherapists, as reported previously.[27] Implementing mobilisation protocols, as seen in other settings,[30,31] could address this gap and improve EM practices in Windhoek ICUs. The non-referral of a significant proportion of ventilated patients to physiotherapy suggests additional barriers that need to be addressed, potentially through targeted interventions to increase referrals and ensure that all eligible patients are considered for mobilisation.

Most patients who received EM were mobilised within 48 hours of ICU admission and received mobilisation once daily. This practice is consistent with recommendations from previous studies, which suggest that EM is both feasible and beneficial in ICU settings and a standard practice in well-resourced settings.[11,32] The high rate of EM within 48 hours could be explained by the presence of cardiac and orthopaedic protocols that guide mobility practice in these Windhoek ICUs. However, the frequency of mobilisation being mainly once daily contrasts with some studies that advocate for more frequent sessions to optimise patient outcomes.[19,26,33] The present study's findings suggest that while EM is being implemented, there may be room for increasing the frequency of sessions to further enhance patient recovery.

The median LOS for patients who were not mobilised in the ICU was 2 days compared

Table 1. Sample characteristics (*N*=870)

Characteristic	*n* (%)
Sex	
Male	538 (61.8)
Female	332 (38.2)
Age range (years)	
18 - 49	266 (30.6)
50 - 64	344 (39.5)
65 - 74	171 (19.7)
75 - 84	82 (9.4)
≥85	7 (0.8)
Admission source	
Theatre	391 (44.9)
Cath lab	179 (20.6)
Casualty	125 (14.4)
Wards	94 (10.8)
Other hospital	78 (9.0)
Unspecified	3 (0.3)
Admission type	
Planned	577 (66.3)
Emergency	293 (33.7)
Admission timing	
Immediate	849 (97.6)
Delayed	21 (2.4)
Diagnosis category	
Coronary angiogram	179 (20.6)
Cardiac condition	113 (13.0)
Cardiac surgery	90 (10.3)
Total knee replacement	86 (9.9)
Medical condition	59 (6.8)
Spinal surgery	55 (6.3)
Motor vehicle accident	54 (6.2)
Abdominal surgery	49 (5.6)
Respiratory condition	46 (5.3)
Total hip replacement	43 (4.9)
Other	96 (11.0)
Ventilatory support	
Invasive	166 (19.1)
Non-invasive	7 (0.8)
None	697 (80.1)
Initial mode of ventilation	
Non-invasive CPAP	7 (0.8)
Invasive CPAP with pressure support	9 (1)
NAVA	1 (0.1)
Pressure-regulated volume control	1 (0.1)
SIMV	153 (17.6)
Assist-control ventilation	2 (0.2)

CPAP = continuous positive airway pressure; NAVA = neurally adjusted ventilatory assist; SIMV = synchronised intermittent mechanical ventilation.

with 3 days for those who were mobilised ($p<0.0001$). Three systematic reviews suggested an association between EM and reduced ICU LOS,[8,34,35] whereas another systemic review found no consistent effect on LOS.[36] Our finding probably reflects that patients who stay longer in the ICU are more likely to be mobilised, and that postoperative cardiac patients routinely referred for mobilisation 1 day after uncomplicated surgery normally stay 2 - 3 days in the ICU. The negative association between mortality and being mobilised in the ICU is likely to be due to more severely ill patients not being considered appropriate candidates for active rehabilitation. It is important to note that this study was not designed to determine the effect of EM on LOS or mortality, and association cannot be equated with causation.

Study limitations

This study has several limitations inherent to its retrospective design. The reliance on existing medical records, which were not originally intended for research purposes, may have resulted in inconsistent data. Additionally, the data were mainly from one private hospital, which may limit the generalisability of the findings to other settings, particularly government hospitals with different patient demographics and resource availability. Furthermore, the study captured admission ventilation status and not status at the specific time of mobilisation, and patients may have been weaned from mechanical ventilation prior to mobilisation interventions. The relationship between ventilation status and mobilisation techniques could therefore not be analysed. Future research should prospectively collect data on these practices to provide a more detailed understanding of mobilisation in the ICU.

Conclusion

This study provides valuable insights into patient profiles and physiotherapy mobility practices in Windhoek ICUs, highlighting the importance of EM in improving patient outcomes. In those who were mobilised, the high rate of EM within 48 hours suggests that this practice is feasible and can be integrated into routine care. However, the study also identifies areas for improvement, such as increasing the proportion of patients referred to physiotherapy, enhancing the frequency of mobilisation sessions, and implementing screening for mobilisation readiness. Clinicians should consider these findings when developing and refining ICU care protocols to ensure comprehensive and evidence-based patient management.

Future research should focus on developing and evaluating standardised protocols for EM that account for the unique needs of different patient populations, including those in public healthcare settings. This research could involve prospective studies to establish causal relationships between EM and patient outcomes, as well as comparative analyses across different healthcare settings to enhance the generalisability of findings. Additionally, exploring strategies to overcome barriers to EM in resource-constrained environments could provide valuable insights for improving patient care in diverse settings.

Data availability. The datasets generated and analysed during the present study are available from the corresponding author (IdP) on reasonable request.

Declaration. The research for this study was done in partial fulfilment of the requirements for SF's MSc (Physiotherapy) degree in the Department of Health and Rehabilitation Sciences, Faculty of Health Sciences, University of Cape Town.

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Author contributions. IdP, SF and BM were involved in conceptualisation. SF was responsible for the data collection. IdP and BM were supervisors of this master's degree research project and co-wrote the article.

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