

Impact of Early Ambulation Protocols Led by Nurses on Recovery Outcomes in Orthopedic Surgery Patients

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Abstract: **Background:** It is believed the phenomenon of an early ambulation is one of the important elements in an enhanced orthopedic surgery recovery program. Of those interventions, nurses can play a lead role on ambulation intervention which can be critical in the speed of functional recovery, medical complications, and patient satisfaction. **Objective:** The proposed research is an assessment of the validity of the guidelines where adopted and adhered by the nursing personnel with regards to the overall patient outcome in an orthopedic consulting room. **Techniques:** Comparative study design that needed to be done was prospective in orthopedic patients in postoperative stage. These two clusters were the groups, which were divided such that one group was restricted to good postoperative care services but the second group was exposed to nurse direction recommendation that incorporated early ambulatory services. Recovery outcomes measures were length of stay, post operative pain, post operative incidence of complication (e.g. deep vein thrombosis, pulmonary complications), level of mobility and satisfaction of the patient. **Findings:** Ambulated at an earlier time than the nurse led to a group with much lower rates of hospitalization, faster score in the increase in mobility levels, less pain and decreased cases of complications evaluated to the manage group. Furthermore the overall patient satisfaction with recovery in the intervention group was better. Premature ambulation guidelines among nurses produce a considerable beneficial impact on the outcome of orthopedic surgery patients. .Structured ambulation programs can be integrated into the nursing care of patients undergoing surgery to improve their recovery, reduce complications, and help to provide cost-effective healthcare services.

Keywords: Early ambulation, Orthopedic surgery, Nurse-led protocols, Postoperative recovery, Mobility outcomes, Patient satisfaction.

INTRODUCTION

Orthopedic surgery, encompassing procedures such as joint replacements, fracture fixations, and spinal interventions, is associated with significant postoperative challenges that can delay recovery. The most common obstacles to the best results are pain, immobility and high risk of complications including venous thromboembolism, lung dysfunction, and weakness. Long-term bed rest has been historically prescribed following major orthopedic surgery but evidence is growing that immobilization is a source of adverse events, a slowing of functional dependence and excessive health care costs [1].

Early Ambulation One of the primary components of Enhanced Recovery After Surgery (ERAS) models has been early ambulation during the first 24-48 hours of the operation. Early mobilization has been shown to be efficient in enhancing circulation, pulmonary functions, reducing thromboembolic event occurrence and enhancing baseline mobility earlier[2]. Furthermore, early ambulation is associated with psychological benefits, including improved mood and patient confidence during recovery (Figure 1).

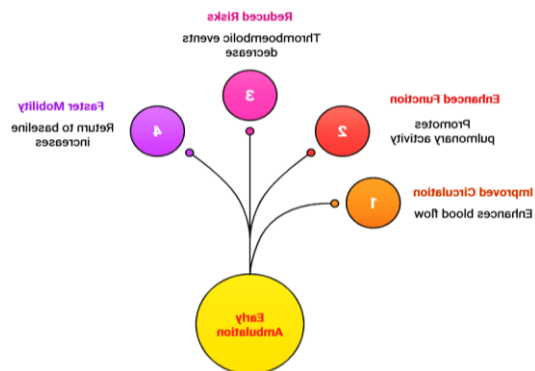


Figure 1: Nurse Led Ambulation Improves Orthopedic Recovery

The contribution of nurses is significant to the successful adoption of ambulation protocols. This has been achieved because they are always at the bedside where they can closely monitor the patients, educate them, motivate and intervene whenever there are problems. Nurse based protocols provide a framework that introduces ambulation early, safely and befitting to the physical status of the patient and the procedure. Evidence from surgical care settings indicates that nurse-led interventions enhance adherence to rehabilitation plans,

reduce variability in care, and improve overall patient satisfaction [3].

Considering these advantages, the knowledge gaps in the literature about the direct impact of the nurse-led protocol of early ambulation on orthopedic surgery patients in specific are identified. The literature available is replete with multidisciplinary ERAS interventions, with little or no separation on the independent role of the mobilization led by nurses. Considering the increasing demand for orthopedic surgeries worldwide and the need to optimize postoperative outcomes in a cost-effective

manner, it is essential to evaluate the effectiveness of structured, nurse-led ambulation strategies [4].

The present paper is a research on the force of premature ambulation on the postoperative recovery of orthopedic patients initiated by the nurses themselves. The primary measured outcomes include length of stay, complication, mobility, pain and patient satisfaction. By focusing on the central role of nursing staff, this study highlights the potential of empowering nurses through structured protocols to enhance patient recovery, improve quality of care, and reduce the overall burden on healthcare systems [5].

MATERIALS AS WELL AS TECHNIQUES

Study Design and Setting

It was a prospective, comparative study that was conducted in Orthopedics department of the Sunrise Multispecialty Hospital in India in the month of January through June 2024. The main objective was to assess whether nurse-led early ambulation strategy could influence postoperative outcomes, through enhanced recovery of orthopedic surgery patients [6].

Study Population

One hundred patients between 18 and 70 years of age experience elective orthopedic health centre (hip substitute, knee substitute, and fracture repair) were selected. The patients who experienced a pre-existing mobility impairment, patient with severe cardiopulmonary disease, patient with a neurological disorder or a patient who was admitted to intensive care unit after surgery were also excluded. Informed consent was chosen to be done in writing [7].

Sample Size as well as Grouping

Participants (n = 100) be randomly due keen on two clusters [8]:

- *Control Group* (n = 50): Received standard postoperative care including physiotherapy as advised by the orthopedic team.
- *Intervention Group* (n = 50): Received a structured, nurse-led early ambulation protocol in addition to standard care (Figure 2).

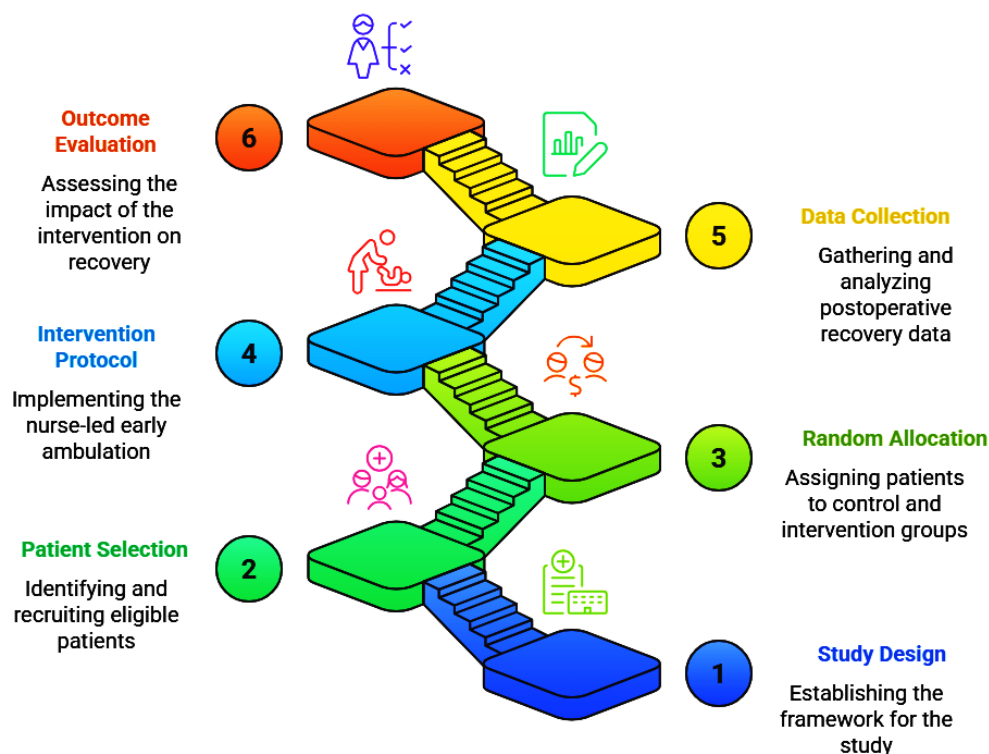


Figure 2: Implementing Early Ambulation Protocol

Intervention: Nurse-Led Early Ambulation Protocol

The intervention was designed by the nursing team and implemented within 24 hours post-surgery if the patient was hemodynamically stable. The stepwise mobilization plan included [9]:

1. *Day 1:* Assisted sitting on bedside, deep breathing exercises.
2. *Day 2:* Standing with support, short ambulation (3–5 meters).
3. *Day 3 onwards:* Gradual increase in walking distance and frequency under nurse supervision. Daily documentation was maintained, and patients were encouraged through education and motivational reinforcement.

Outcome Measures

- *Primary outcomes:*
 - Length of hospital stay (days).
 - Postoperative mobility assessed using the Timed Up and Go (TUG) Test.
 - Complications with one of the following: deep vein thrombosis (DVT), pulmonary complications, or wound infection[10].
- *resulting outcome:*
 - The intensity of pain assessed through the Visual Analog Scale (VAS).
 - The patient satisfaction measured on a 10-point Likert scale survey [11].

Statistical Analysis

The Statistical Package 26.0 was used to analyze the data. Mean $\pm$ standard deviation (SD) and independent t-tests were used to compare the results of continuous variables. Chi-square tests were used to analyze access to the censuses that are categorical. The statistically significant a p-value =0.05 was used [12].

Moral concerns

The Institutional Ethics Committee of Sunrise Multispecialty Hospital (Approval No: SMH/IEC/2023/014) had approved the study. Every patient signed the informed consent form before enrolment [13].

RESULTS

Study Population

One hundred patients undergoing elective orthopedic surgery were recruited and assigned the control group (n = 50) and an intervention group (n = 50). The demographic and baseline variables (age, gender, type of surgery) were similar between the groups and did not have statistical significance of difference ($p > 0.05$) (Table 1, Figure 3).

Table 1: Demographic and Baseline features of Patients

feature	Control Group (n=50)	Intervention Group (n=50)	p-value
Age (years, mean $\pm$ SD)	55.2 $\pm$ 10.3	54.7 $\pm$ 9.8	0.72
Gender (M/F)	28/22	27/23	0.84
Type of surgery (%)			
– Hip replacement	18 (36%)	17 (34%)	0.82
– Knee replacement	20 (40%)	21 (42%)	0.83
– Fracture fixation	12 (24%)	12 (24%)	1.00

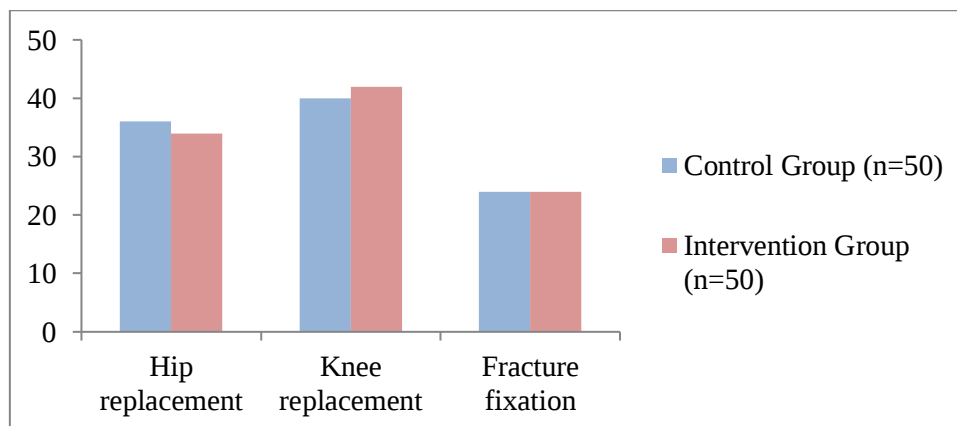


Figure 3: Graphical presentation of type of Surgery

The average hospital stay was also significantly shorter in the intervention one (5.1 $\pm$ 1.2 days) than in the control one (7.2 $\pm$ 1.8 days, $p < 0.001$). At the time of discharge, postoperative mobility, measured in the Timed Up and Go (TUG) Test, exhibited better results in the intervention group (15.8 $\pm$ 3.5 seconds) than in the control group (23.5 $\pm$ 4.2 seconds, $p < 0.001$).

The incidence of complications was less in the group of intervention and contained 1 case of deep vein thrombosis (DVT) and 1 pulmonary complication as opposed to 6 DVTs and 4 pulmonary complications in the control group ($p = 0.04$) (Table 2).

Table 2: Assessment of Primary Outcomes

Outcome	Control Group (n=50)	Intervention Group (n=50)	p-value
Length of hospital stay (days)	7.2 $\pm$ 1.8	5.1 $\pm$ 1.2	<0.001
TUG Test (seconds)	23.5 $\pm$ 4.2	15.8 $\pm$ 3.5	<0.001
Postoperative complications	10 (20%)	2 (4%)	0.04
– DVT	6	1	
– Pulmonary complications	4	1	

Secondary Outcomes

The measurement of pain by the Visual Analog Scale (VAS) on the postoperative Day 3 showed a statistically significant lower score in the intervention group (4.3 $\pm$ 1.0) than the control group (6.8 $\pm$ 1.1, $p < 0.001$). The patient satisfaction measured with a 10-point Likert scale was better in the intervention group (9.0 $\pm$ 0.9) than in the control group (7.2 $\pm$ 1.4, $p < 0.001$) (Table 3).

Table 3: Assessment of Secondary Results

Outcome	Control Group (n=50)	Intervention Group (n=50)	p-value
VAS pain score (Day 3)	6.8 $\pm$ 1.1	4.3 $\pm$ 1.0	<0.001
Patient satisfaction (10-point scale)	7.2 $\pm$ 1.4	9.0 $\pm$ 0.9	<0.001

DISCUSSION

The present study demonstrates that nurse-led early ambulation protocols significantly improve postoperative recovery outcomes in orthopedic surgery patients. Patients in the intervention collection have shorter stays in hospitals, recovered mobility faster, less pain, fewer complications and were more satisfied than individuals in the control group. The results of these studies demonstrate the importance of the structured nursing intervention in the improvement of the postoperative rehabilitation [14].

Extent of Hospital Stay and Mobility

Mean length of stay in the hospital was also significantly low in intervention group (5.1 $\pm$ 1.2 days) than in the control group (7.2 $\pm$ 1.8 days). This reduction aligns with previous studies suggesting that early mobilization accelerates functional recovery and facilitates earlier discharge by promoting circulation, enhancing pulmonary function, and preventing deconditioning. Improved mobility scores, reflected in lower TUG test times in the intervention group (15.8 $\pm$ 3.5 s vs. 23.5 $\pm$ 4.2 s), indicate that early, supervised ambulation enables patients to regain independence more rapidly. These findings underscore the efficacy of structured, nurse-led protocols in standardizing mobilization practices and optimizing patient outcomes [15].

Postoperative Complications

The rates of complications, especially deep vein thrombosis and pulmonary, were significantly reduced in

the intervention (4%) as compared to the control group of (20) percent. Early ambulation likely reduces venous stasis, enhances pulmonary ventilation, and minimizes immobility-related risks. These results are consistent with literature reporting that structured mobilization protocols significantly reduce thromboembolic and respiratory complications after orthopedic procedures [16].

Pain and Patient Satisfaction

Pain scores on postoperative Day 3 were considerably lower in the intervention grouping (VAS 4.3 $\pm$ 1.0) compared to controls (VAS 6.8 $\pm$ 1.1). Early ambulation may contribute to reduced pain perception by preventing stiffness and enhancing joint mobility. Also, the patient satisfaction in the intervention group was more high (9.0 $\pm$ 0.9 vs 7.2 $\pm$ 1.4) which shows the beneficial psychological effect of active engagement in recovery and the organization of nursing personnel support [17].

Role of Nurses

The results indicate the importance of nurses in postoperative care. Nurses can provide safe and effective mobilization using stepwise ambulation, progress monitoring, and patient education and motivation. This patient-centered model facilitated by nurses enables patients with more empowerment, less randomness in healthcare delivery, and better compliance with rehabilitation guidelines[18].

CONCLUSION

The study demonstrates that nurse-led early ambulation protocols significantly improve postoperative recovery in orthopedic surgery patients. Structured mobilization led to a shorter hospital stay, faster functionalization, less occurrence of postoperative complications, less pain, and increased patient satisfaction than the conventional care. These results play a key role in postoperative rehabilitation and support the adoption of early ambulation guidelines into orthopedic practice. Adopting such nurse-led strategies can optimize recovery, enhance patient outcomes, and contribute to more efficient, cost-effective healthcare delivery.

REFERENCES

1. Andelic N, Bautz-Holter E, Ronning P, et al. Does an early onset and continuous chain of rehabilitation improve the long-term functional outcome of patients with severe traumatic brain injury? *J Neurotrauma.* 2012;29(1):66-74.
2. Azuh O, Gammon H, Burmeister C, et al. Benefits of early active mobility in the medical intensive care unit: a pilot study. *Am J Med.* 2016;129(8):866-871.
3. Cho E, Jang MR, Moon JR, et al. Effects of time of bed rest on vascular complications after cardiac catheterization in pediatric patients with congenital heart disease: a randomized controlled trial. *Heart Lung.* 2023;60:52-58.
4. Cumpston M, Li T, Page MJ, et al. Updated guidance for trusted systematic reviews: a new edition of the Cochrane handbook for systematic reviews of interventions. *Cochrane Database Syst Rev.* 2019;10(10):ED000142.
5. Davis KM, Eckert MC, Shakib S, et al. Development and implementation of a nurse-led model of care coordination to provide health-sector continuity of care for people with multimorbidity: protocol for a mixed methods study. *JMIR Res Protoc.* 2019;8(12):e15006.
6. de Biasio JC, Mittel AM, Mueller AL, Ferrante LE, Kim DH, Shaefi S. Frailty in critical care medicine: a review. *Anesth Analg.* 2020;130(6):1462-1473.
7. Dikkema Y, Mouton LJ, Cleffken B, et al. Facilitators & barriers and practices of early mobilization in critically ill burn patients: a survey. *Burns.* 2023;49(1):42-54.
8. Dong Z, Liu Y, Gai Y, et al. Early rehabilitation relieves diaphragm dysfunction induced by prolonged mechanical ventilation: a randomised control study. *BMC Pulm Med.* 2021;21:8.
9. Dong Z, Yu B, Zhang Q, et al. Early rehabilitation therapy is beneficial for patients with prolonged mechanical ventilation after coronary artery bypass surgery: a prospective random study. *Int Heart J.* 2016;57(2):241-246.
10. Dong ZH, Yu BX, Sun YB, Fang W, Li L. Effects of early rehabilitation therapy on patients with mechanical ventilation. *World J Emerg Med.* 2014;5(1):48-52.
11. Eggmann S, Verra ML, Luder G, Takala J, Jakob SM. Effects of early, combined endurance and resistance training in mechanically ventilated, critically ill patients: a randomised controlled trial. *PLoS One.* 2018;13(11):e0207428.
12. Escalon MX, Lichtenstein AH, Posner E, Spielman L, Delgado A, Kolakowsky-Hayner SA. The effects of early mobilization on patients requiring extended mechanical ventilation across multiple ICUs. *Crit Care Explor.* 2020;2(6):e0119.
13. Fossat G, Baudin F, Courtes L, et al. Effect of in-bed leg cycling and electrical stimulation of the quadriceps on global muscle strength in critically ill adults: a randomized clinical trial. *JAMA.* 2018;320(4):368-378.
14. Gitti N, Renzi S, Marchesi M, et al. Seeking the light in intensive care unit sedation: the optimal sedation strategy for critically ill patients. *Front Med (Lausanne).* 2022;9:901343.
15. Gruther W, Pieber K, Steiner I, Hein C, Hiesmayr JM, Paternostro-Sluga T. Can early rehabilitation on the general ward after an intensive care unit stay reduce hospital length of stay in survivors of critical illness?: a randomized controlled trial. *Am J Phys Med Rehabil.* 2017;96(9):607-615.
16. Hodgson CL, Bailey M, Bellomo R, et al. A binational multicenter pilot feasibility randomized controlled trial of early goal-directed mobilization in the ICU. *Crit Care Med.* 2016;44(6):1145-1152.
17. Hodgson CL, Capell E, Tipping CJ. Early mobilization of patients in intensive care: organization, communication and safety factors that influence translation into clinical practice. *Crit Care.* 2018;22(1):77.
18. Machado AD, Pires-Neto RC, Carvalho MT, Soares JC, Cardoso DM, Albuquerque IM. Effects that passive cycling exercise have on muscle strength, duration of mechanical ventilation, and length of hospital stay in critically ill patients: a randomized clinical trial. *J Bras Pneumol.* 2017;43:134-139.