SITTING POSITIONING IN DEPENDENT PATIENTS – PRACTICE OF NURSING STUDENTS

Sedestação em utentes dependentes – prática dos estudantes de enfermagem

Sedestación en pacientes dependientes – práctica de los estudiantes de enfermería

Guilherme António*, Natália Galício**, Núria Simão***, Pedro Silva****, Pedro Gaspar*****

ABSTRACT

Background: immobility is characterised by limitations in movement and suppression of joint mobility, potentially leading to various complications. Sitting positioning and mobility, when integrated into an appropriate care plan, can prevent multiple adverse outcomes and improve patients' quality of life. **Objectives:** to describe nursing students' practice regarding chair transfer in dependent patients and to assess its adequacy and the factors influencing its implementation. **Methodology**: a cross-sectional, analytical, correlational quantitative study was conducted with a convenience sample of 106 nursing students. Data were collected via an online questionnaire. **Results:** the majority of patients (85; 80.19%) were transferred to an armchair. Patients with greater muscle strength remained seated for longer periods, exhibited fewer signs of intolerance, and required fewer assistive devices. A non-significant trend was observed whereby patients showing more signs of intolerance used more support devices. No statistically significant differences were found between available human and material resources and the implementation of sitting positioning. **Conclusion:** nursing students recognise sitting positioning as essential in preventing complications associated with immobility. They highlight the importance of muscular strength, continuous assessment, and effective resource management, reinforcing the need for individualised care and targeted professional training.

Keywords: sitting position; rehabilitation; nursing; secondary prevention

*BSc., School of Health Sciences, Polytechnic of Leiria, Leiria, Portugal – https://orcid.org/0009-0005-6289-6433

**BSc., School of Health Sciences, Polytechnic of Leiria, Leiria, Portugal - https://orcid.org/0009-0009-0017-096X

***BSc., School of Health Sciences, Polytechnic of Leiria, Leiria, Portugal - https://orcid.org/0009-0001-3579-9102

****BSc., School of Health Sciences, Polytechnic of Leiria, Leiria, Portugal – https://orcid.org/0009-0004-9808-7219

*****PhD., ciTechCare – Center for Innovative Care and Health Technology, Polytechnic of Leiria, Leiria, Portugal - https://orcid.org/0000-0001-8996-4356

Corresponding Author:
Pedro Gaspar
pedro.gaspar@ipleiria.pt

How to cite:
António, G., Galício, N., Simão, N., Silva, P., & Gaspar, P. (2025). Sitting positioning in dependent patients – practice of nursing students. *Revista de Investigação & Inovação em Saúde, 8*(2), 1-14. https://doi.org/10.37914/riis.v8i2.493

Received: 07/07/2025
Accepted: 17/12/2025

RESUMO

Enquadramento: a imobilidade caracteriza-se por limitações no movimento e supressão dos movimentos articulares, podendo resultar em diversas sequelas. A sedestação e a mobilidade, associadas a um adequado plano de cuidados, podem prevenir diversas complicações e melhorar a qualidade de vida do utente. **Objetivos:** descrever a prática dos estudantes de enfermagem sobre o levante para cadeirão em utentes dependentes e compreender a sua adequabilidade e os fatores que influenciam a sua realização. **Metodologia:** estudo quantitativo analítico correlacional transversal em amostra conveniente de 106 estudantes de enfermagem. Dados recolhidos através de formulário online. **Resultados:** a maioria dos utentes 85 (80,19%) realizou sedestação para cadeirão. Os utentes com maior força muscular realizaram sedestação durante mais tempo, apresentaram menos sinais de intolerância e utilizaram menos produtos de apoio, observando-se uma tendência, sem significado estatístico, para utentes com mais sinais de intolerância utilizarem mais dispositivos de apoio. Não foram encontradas diferenças estatisticamente relevantes entre a disponibilidade dos recursos materiais e humanos e a realização de sedestação. **Conclusão:** os estudantes reconhecem a sedestação como essencial na prevenção de complicações da imobilidade. Destacam a importância da força muscular, da avaliação contínua e da gestão adequada de recursos, reforçando a necessidade de cuidados individualizados e formação específica.

Palavras-chave: postura sentada; reabilitação; enfermagem; prevenção secundária

RESUMEN

Marco contextual: la inmovilidad se caracteriza por limitaciones en el movimiento y supresión de los movimientos articulares, lo que puede dar lugar a diversas secuelas. La sedestación y la movilidad, integradas en un plan de cuidados adecuado, pueden prevenir múltiples complicaciones y mejorar la calidad de vida del paciente. **Objetivos:** describir la práctica de los estudiantes de enfermería sobre la transferencia al sillón en pacientes dependientes y comprender su adecuación y los factores que influyen en su realización. **Metodología:** estudio cuantitativo, analítico, correlacional y transversal, con una muestra por conveniencia de 106 estudiantes de enfermaría. Los datos fueron recogidos mediante un formulario en línea. **Resultados:** la mayoría de los pacientes (85; 80,19%) fueron trasladados al sillón. Aquellos con mayor fuerza muscular permanecieron más tiempo en sedestación, presentaron menos signos de intolerancia y utilizaron menos productos de apoyo. Se observó una tendencia, sin significación estadística, a que los pacientes con más signos de intolerancia utilizaran más dispositivos de apoyo. No se encontraron diferencias estadísticamente significativas entre los recursos materiales y humanos disponibles y la realización de la sedestación. **Conclusión:** los estudiantes reconocen la sedestación como una intervención esencial en la prevención de complicaciones derivadas de la inmovilidad. Destacan la importancia de la fuerza muscular, de la evaluación continua y de la gestión adecuada de recursos, reforzando la necesidad de cuidados individualizados y formación específica.

Palabras clave: sedestación; rehabilitación; enfermería; prevención secundaria

INTRODUCTION

Immobility constitutes a public health concern whose physical, psychological, and social repercussions significantly compromise the quality of life of individuals in situations of dependency. Among the strategies used to prevent these complications, seated positioning stands out as a central intervention within the nursing care plan, promoting not only mobility but also functional recovery, cognitive stimulation, and overall well-being. Its early and appropriate implementation contributes to reducing the sequelae associated with immobility, generating benefits that range from improved respiratory and haemodynamic function to the prevention of skin and joint lesions, and it aligns with clinical best practices supported by scientific evidence.

The nurse, as a professional with a pivotal role in providing individualised care, is responsible for the early identification of risk factors associated with immobility and for implementing safe and effective therapeutic interventions tailored to the patient's clinical, functional, and emotional condition. However, in clinical practice, discrepancies are sometimes observed between the assessment of the patient's condition and the interventions performed, thereby compromising the effectiveness of the therapeutic plan and subsequent health outcomes.

This study therefore seeks to address the following research questions: What are the nursing students' practices regarding the seated positioning of dependent patients? and Which factors influence the performance of seated positioning?

BACKGROUND

Immobility is a concept with "variable definitions, intrinsically associated with movement or displacement in space (...). The term immobility refers to any limitation of movement and represents an important factor compromising quality of life" (Nascimento et al., 2016, p. 1), and it is directly related to the concept of dependency.

A dependent person presents significant limitations in performing Basic Activities of Daily Living, requiring partial or total assistance for tasks such as feeding, hygiene, mobility, and toileting. The Barthel Index is one of the most widely used instruments to assess functional dependency, assigning scores ranging from 0 (complete dependency) to 100 (complete independence), thus allowing the classification of dependency levels into categories such as mild, moderate, severe, or total (Araújo et al., 2007). The Lawton and Brody Scale complements this assessment by measuring the capacity to perform Instrumental Activities of Daily Living, such as meal preparation, financial management, and transportation use, providing a broader view of autonomy (Silva & Ferretti-Rebustini, 2022). The systematic application of these instruments is essential for planning individualised care, defining rehabilitation strategies, and monitoring clinical progress, thereby ensuring a person-centred and evidence-based approach (Santos et al., 2023).

According to Amorim (2021), immobility is a geriatric syndrome that affects individuals with disabling conditions and results in the suppression of joint movement. It is considered one of the most serious geriatric syndromes, as it encompasses a set of signs and symptoms arising from the deterioration of balance due to the disconnection of

neuromusculoskeletal functions, which leads to functional limitation and progressive dependency.

Various factors contribute to the development of immobility, including psychological, social, and physical factors (Nascimento et al., 2016). According to Figueiredo et al. (2024), risk profiles for the development of immobility syndrome also include poor family support, insufficient bed mobility, malnutrition, cognitive deficits, and iatrogenesis. Prolonged immobility is associated with multiple complications, such as neuromuscular dysfunction, generalised weakness, respiratory complications, and increased risk of pressure ulcer development (Severino, 2016).

According to Lima and Ferreira (2016), adequate nursing care planning is essential for preventing the sequelae of immobility, and it should include interventions that promote mobility and self-care. A structured rehabilitation plan incorporating early mobilisation, respiratory care, and self-care education strategies is crucial for preventing severe complications and promoting more efficient recovery (Cerqueira & Grilo, 2019).

It is important to emphasize that prolonged bed rest has multiple harmful effects, particularly in older adults (Bisset, 2017; Knight et al., 2009a; Knight et al., 2009b; Nigam et al., 2009). Muscle strength loss is particularly rapid during the first days of immobilisation, reaching values close to 10–15% per week under prolonged rest (Marusic et al., 2021; Mesquita & Gardenghi, 2016).

At the circulatory level, prolonged bed rest and immobility may increase heart rate by up to one beat per minute every two days of rest, impair myocardial blood flow, and favour deep venous thrombosis due to blood stasis (Guedes et al., 2018). At the respiratory level, immobility reduces pulmonary capacity, increasing the risk of infection due to impaired secretion clearance (Guedes et al., 2018). In the musculoskeletal system, it leads to muscle mass loss, resulting in muscle weakness and joint contractures, thereby reducing functional mobility and patient independence (Wall et al., 2014). At the integumentary level, immobility increases the risk of pressure ulcers, particularly over bony prominences such as the sacrococcygeal region and heels (Nigam et al., 2009). At the urinary and gastrointestinal levels, it increases the risk of kidney stone formation due to reduced urinary flow and contributes to constipation due to decreased intestinal motility (Guedes et al., 2018).

Seated positioning is a simple and essential nursing intervention that significantly contributes to preventing immobility-related sequelae, particularly in bedridden or mobility-restricted patients (Teixeira et al., 2023). Seated positioning refers to the posture in which the patient remains sitting with the trunk upright and the lower limbs supported, usually with the feet on the floor or hanging. In nursing practice, it is an early mobilisation strategy aimed at improving respiratory and haemodynamic function; preventing immobility-related complications such as pressure ulcers and deep vein thrombosis; stimulating autonomy and postural control; and facilitating neuromuscular and cognitive rehabilitation (Schütz, 2019). Although generally well tolerated and beneficial for haemodynamic stability, continuation of seated positioning must be carefully assessed, particularly when signs of intolerance occur, requiring individualised attention and ongoing monitoring by nurses (Teixeira et al., 2023). It is indicated when the

patient presents haemodynamic stability, absence of severe neurological or orthopedic contraindications, and minimal capacity to maintain trunk support. However, it is contraindicated in situations of clinical instability such as severe postural hypotension, uncontrolled arrhythmias, significant hypoxemia, or the presence of invasive devices without adequate support, as it increases the risk of falls and cardiovascular decompensation (França et al., 2012; Teixeira et al., 2023). Decisions must be based on a multidisciplinary assessment considering vital signs, effort tolerance, physical and cognitive capacity, and positioning safety to ensure benefits without compromising patient integrity (Thielo et al., 2020).

Nurses distinguish themselves by providing continuous monitoring in inpatient settings and by possessing training that enables accurate identification of individual needs and limitations. Developing a personalized care plan is essential for promoting mobility and, consequently, self-care, thus preventing or mitigating sequelae (Cerqueira & Grilo, 2019). Patient assessment must be conducted holistically, particularly with regard to muscle strength and level of consciousness, in order to understand limitations and determine the conditions required for specific interventions. Following assessment, care planning and intervention implementation should occur as early as possible to prevent deterioration of the patient's clinical condition (Baptista, 2017). Interventions must be adapted to the patient's degree of dependency, whereby the nurse performs activities for patients who are fully dependent and assists partially dependent patients, promoting autonomy (Orem, 1971). This care plan should be updated frequently through reassessment, enabling intervention restructuring according to patient evolution or the emergence of new impairments (Baptista, 2017).

Muscle strength is essential for various motor tasks, including seated positioning. Strength in both upper and lower limbs is directly related to the ability to perform movements against gravity, such as standing up, sitting down, and maintaining postural balance (Cakmak, 2023; Suchomel et al., 2018). Therefore, safe and effective seated positioning requires adapting the level of support provided to the patient according to their muscle strength, using increasingly complex interventions and devices as muscle strength declines (Kumar et al., 2022).

The patient's level of consciousness is a determining factor for safe seated positioning, as it directly influences their ability to cooperate with mobilisation and maintain postural balance. Instruments such as the Glasgow Coma Scale and other methods for assessing consciousness level are essential for identifying cognitive alterations that may compromise safety during transfer to the seated position, as patients with reduced consciousness are at increased risk of falls, haemodynamic instability, and injury, requiring compensatory strategies or temporary contraindication of seated positioning (Pires et al., 2021). Thus, systematic assessment of consciousness levels must be integrated into mobilisation protocols to ensure benefits without compromising patient integrity.

Hospital immobility is often strongly influenced by organizational factors such as insufficient material resources, including appropriate armchairs, and human resources, which reduce the time available for nursing teams to perform seated positioning (Rønning et al., 2024). However, according to the same authors,

other factors may contribute even more to the lack of patient mobilisation into armchairs, such as cultural factors in which prolonged bed rest is normalized and seated positioning is undervalued, with other care activities being prioritized even when sufficient resources are available.

The training of nursing students must include practical competencies related to early mobilisation, including safe seated positioning (Alves et al., 2024; Reis et al., 2021). Integrating these competencies into education will enable future professionals to develop an evidence-based approach, ensuring safety and effectiveness when performing seated positioning, particularly in dependent or critically ill patients (Holstein & Castro, 2021).

METHODOLOGY

This study employed a cross-sectional, analytical, correlational quantitative design. The target population consisted of undergraduate nursing students from a Portuguese School of Health who had provided care to dependent individuals during their clinical training in professional integration. A non-probability, convenience sample was used, comprising 106 students who reported their clinical practice experiences regarding the seated positioning of dependent patients. Inclusion criteria were fourth-year undergraduate nursing students who were undertaking clinical placement and who voluntarily agreed to participate in the study.

Data collection took place between March and May 2025 using an online questionnaire administered via Google Forms. Students were asked to report, based on their past 48 hours of care, on the condition and management of the most dependent patient under their responsibility. The questionnaire collected information on the patient's physical capacity and muscle strength, assessed using the Medical Research Council (MRC) scale, as well as their level of consciousness or mental status. Items relating to physical capacity and level of consciousness/mental status were adapted from the Perme Intensive Care Unit Mobility Score (Perme et al., 2014). Additional variables included the material resources available for patient mobilisation; whether the patient was transferred to a armchair; the manner and duration of the seated positioning; the presence of any complications; and the student's perception of the adequacy of material and human resources for promoting patient mobility, rated on a scale from *Very insufficient* to *Many resources available*.

All data were processed anonymously, ensuring confidentiality and protection of the information provided. Participation was voluntary and conditional upon informed consent.

Statistical analysis was conducted using the Statistical Package for the Social Sciences (SPSS), version 29. The Kolmogorov–Smirnov test was applied to assess the normality of the sample distribution, which was found to be non-normal ($p < 0.05$); therefore, non-parametric statistical tests were used in subsequent analyses.

This study received approval from an Ethics Committee (Approval No. CE…/06/2020), and all ethical and formal standards were strictly observed.

RESULTS

The sample consisted of 106 care experiences involving dependent individuals, reported by fourth-year undergraduate nursing students during their clinical placements. Most of the reported experiences (n = 99;

93.40%) occurred in hospital settings, whereas 7 (6.60%) took place in home-care environments.

Regarding the mental status of the patients (n = 106), students reported that the majority were awake and alert (n = 83; 78.30%), followed by lethargic individuals (n = 20; 18.87%), and finally non-responsive patients (n = 3; 2.83%). Concerning the ability to follow two to three simple commands, 88 patients (83.02%) demonstrated this capacity, while 18 (16.98%) did not. Table 1 summarises the data on lower- and upper-limb muscle strength, as assessed using the Medical Research Council (MRC) scale, and the patient's ability to lift the lower limbs approximately 20 degrees against gravity and the upper limbs approximately 45 degrees with elbow extension. A majority of reports (n = 67; 63.21%) indicated that the patient was able to raise the right lower limb about 20 degrees against gravity, and 64 (60.38%) reported the same ability for the left lower limb. The mean muscle strength of the right lower limb was 3.42 (SD = 1.43), and the mean for the left lower limb was 3.29 (SD = 1.46).

With regard to upper-limb elevation of approximately 45 degrees against gravity with the elbow extended, 85 reported experiences (80.19%) indicated that the patient was able to lift the right upper limb, and 81 (76.42%) reported the same for the left upper limb. The mean strength of the right upper limb was 3.85 (SD = 1.30), and that of the left upper limb was 3.77 (SD = 1.31).

Table 1

Assessment of upper- and lower-limb muscle strength using the MRC Scale

		n.	%					
Right Lower Limb (RLL): The patient was able to raise the leg against gravity to approximately 20 degrees with the knee extended.	**No**	39	36,79	**MRC Scale Strength**	**Min.**	**Max.**	**M**	**SD**
	Yes	67	63,21		0	5	3,42	1,43
	Total	106	100,00					
Left Lower Limb (LLL): The patient was able to raise the leg against gravity to approximately 20 degrees with the knee extended.	**No**	42	39,62	**MRC Scale Strength**	**Min.**	**Max.**	**M**	**SD**
	Yes	64	60,38		0	5	3,29	1,46
	Total	106	100,00					
Right Upper Limb (RUL): The patient was able to raise the arm against gravity to approximately 45 degrees with the elbow extended.	**No**	21	19,81	**MRC Scale Strength**	**Min.**	**Max.**	**M**	**SD**
	Yes	85	80,19		0	5	3,85	1,30
	Total	106	100,00					
Left Upper Limb (LUL): The patient was able to raise the arm against gravity to approximately 45 degrees with the elbow extended.	**No**	25	23,58	**MRC Scale Strength**	**Min.**	**Max.**	**M**	**SD**
	Yes	81	76,42		0	5	3,77	1,31
	Total	106	100,00					

M – Mean; SD – Standard Deviation

Table 2 presents the barriers to patient mobility reported by the nursing students. Of the 106 students in the sample, 70 (66.04%) identified barriers to patient mobility. The main barriers reported included cognitive impairment, agitation, and altered levels of consciousness, fatigue, weakness, reduced muscle strength, and cerebrovascular accidents. In contrast, 36 students (33.96%) reported no mobility-related difficulties.

Table 2

Barriers to mobility identified in the patients of the sample (n = 106)

Barriers to Mobility Identified	n.
Cognitive Problems, Agitation, and Level of Consciousness: Disorientation; psychomotor agitation (leading to immobilisation of the upper limbs); dementia; confusional state; obtundation; lethargy; drowsiness; confusion…	28
Fatigue, Weakness, and Reduced Strength: Fatigue; muscle weakness; reduced limb strength.	22
Cerebrovascular Events: Acute myocardial infarction; stroke; hemiparesis.	14
Mobility and Motor Deficits (Unspecified): Imbalance; motor incoordination; gait claudication; triplegia; tetraplegia.	8
Pain: Generalised pain; worsening pain; osteoarticular pain.	6
Orthopaedic Problems, Fractures, and Amputations: Knee osteoarthritis; femoral neck fracture; osteolytic lesion of the cervical spine (L3); right trochanteric fracture.	6
Respiratory Problems: Dyspnoea; need for supplemental oxygen via nasal cannula.	4
Behavioural and Emotional Issues: Feelings of resentment regarding hospitalisation; non-compliance with instructions; fear of falling.	3
Other: Obesity, urinary catheterisation, venous catheter; various comorbidities.	15

Regarding the availability of human resources for promoting mobility, evaluated on a scale ranging from 'very insufficient' to 'many,' 27 nursing students (25.47%) considered human resources to be insufficient, 68 (64.15%) considered them sufficient, and 11 (10.38%) perceived the availability of human resources as high. None of the students reported the presence of very insufficient or very abundant human resources.

Table 3 presents the material resources available in the patients' units for performing transfers to the armchair, according to the students' experiences. The majority of units were equipped with electric adjustable beds (n = 87; 82.08%) and ergonomic armchairs (n = 94; 88.68%).

Table 3

Material resources available in the patients' units

		n.	%
Manual adjustable bed	No	86	81,13
	Yes	20	18,87
	Total	106	100,00
Electric adjustable bed	No	19	17,92
	Yes	87	82,08
	Total	106	100,00
Trapeze bar	No	14	13,21
	Yes	92	86,79
	Total	106	100,00
Pressure-redistribution surfaces	No	4	3,77
	Yes	102	96,23
	Total	106	100,00
Ergonomic armchair	No	12	11,32
	Yes	94	88,68
	Total	106	100,00
Hydraulic patient lift	No	20	18,87
	Yes	86	81,13
	Total	106	100,00

Regarding the material resources available and using a scale ranging from 'very insufficient' to 'many resources available', 7 students (6.60%) considered the resources to be insufficient, 58 (54.72%) considered them sufficient, 40 (37.74%) considered them abundant, and 1 student (0.94%) reported the presence of many resources. None of the students classified the existing material resources as very insufficient.

In 85 of the experiences reported in the questionnaires (80.19%), patients were transferred to a armchair, whereas 21 (19.81%) were not. Among the 85 patients who were transferred to a armchair, 67 (78.82%) exhibited no signs of intolerance to seated positioning, while 39 (36.79%) presented signs of intolerance. The most commonly reported signs included pain, discomfort, fatigue, agitation, and altered levels of consciousness.

Among the patients who underwent seated positioning, 55 used pressure-redistribution surfaces, almost exclusively simple cushions (n = 50).

Table 4 presents the duration of seated positioning among the 85 patients who were transferred to a armchair. The minimum duration of seated positioning was 0.40 hours, and the maximum was 12 hours. The mean duration was 4.07 hours with a standard deviation of 1.83 hours.

Table 4

Duration of seated positioning among patients transferred to a armchair (n = 85)

Duration of Seated Positioning (in hours)	**n.**	**Minimum**	**Maximum**	**M**	**SD**
	85	0,40	12,00	4,07	1,83

M – Mean; SD – Standard Deviation

Table 5 presents the types of nursing interventions performed for each patient in the sample who was transferred to a armchair (n = 85). Notably, according to the reported experiences, the most frequently used interventions were partial assistance (n = 32; 37.65%) and supervision (n = 26; 30.59%).

Table 5

Nursing interventions performed during patient transfer to the armchair

Nursing Intervention During Transfer to the Armchair	**n.**	**%**
Supervision	26	30,59
Partial assistance	32	37,65
Total assistance (two persons)	18	21,18
Total assistance (more than two persons)	4	4,71
Total assistance using a hydraulic lift	5	5,88
Total	**85**	**100,00**

Analysing the relationship between muscle strength (MRC) in the upper and lower limbs and seated positioning (Table 6), we observed that patients with higher upper- and lower-limb strength were those who most frequently performed seated positioning. The differences were statistically significant for both upper limbs ($U = 319$; $p = 0.000$) and lower limbs ($U = 281.5$; $p < 0.001$).

Table 6

Transfer to the armchair according to muscle strength (Mann–Whitney U Test)

	Seated positioning performed (n=85)				No seated positioning performed (n=21)				Mann-Whitney U test	
	Mean Rank	M	SD	Med	Mean Rank	M	SD	Med	U	*p*
Upper-Limb Strength (MRC Mean)	60,25	4,19	0,81	4,00	26,19	2,26	1,67	2,00	319,00	0,000
Lower-Limb Strength (MRC Mean)	60,69	3,72	1,15	4,00	24,40	1,88	1,37	2,00	281,50	0,000

M – Mean; SD – Standard Deviation ; Med – Median

Analysing the relationship between muscle strength (MRC) in the upper and lower limbs and the nursing interventions performed during seated positioning (Table 7), we observed that these interventions progress from supervision to total assistance using a hydraulic lift as patient strength decreases. The differences were statistically significant for both the mean upper-limb strength ($\chi^2 = 26.367$; $p < 0.001$) and the mean lower-limb strength ($\chi^2 = 27.987$; $p < 0.001$).

Table 7

Nursing interventions during transfer to the armchair according to muscle strength (Kruskal–Wallis Test)

	Upper-Limb Strength (MRC Mean)				Kruskal Wallis test		Lower-Limb Strength (MRC Mean)				Kruskal Wallis test	
Intervenção de enfermagem na sedestação	**Mean Rank**	**M**	**SD**	**Med**	**X^2**	***p***	**Mean Rank**	**M**	**SD**	**Med**	**X^2**	***p***
Supervision (n=26)	61,13	4,79	0,40	5,00	26,367	0,000	60,75	4,52	0,74	5,00	27,987	0,000
Partial assistance (n=32)	40,42	4,16	0,65	4,00			42,73	3,73	1,06	4,00		
Total assistance (two persons) (n=18)	29,39	3,78	0,77	3,50			28,64	3,08	1,07	3,00		
Total assistance (more than two persons) (n=4)	30,38	3,63	1,25	3,75			22,38	2,63	1,38	2,75		
Total assistance using a hydraulic lift (n=5)	24,30	3,30	1,20	4,00			20,60	2,70	0,97	2,00		

M – Mean; SD – Standard Deviation ; Med – Median

Analysing the relationship between the duration of seated positioning and the signs of intolerance to it (Table 8), we observed that patients without signs of intolerance remained seated for a longer period on average. The differences were statistically significant ($U = 259.0$; $p < 0.001$).

Table 8

Signs of intolerance as a function of sitting time (Mann–Whitney U Test)

	Without signs of intolerance to sitting (n = 51)				With signs of intolerance to sitting (n = 34)				Mann-Whitney U test	
	Mean Rank	M	SD	Med	Mean Rank	M	SD	Med	U	*p*
Time (hours) during which the patient remained seated	54,92	4,95	1,54	5,00	25,12	2,99	1,31	3,00	259,00	0,000

M – Mean; SD – Standard Deviation ; Med – Median

We observed in the results that there were no statistically significant differences regarding the development of signs of intolerance to sitting and the use of pressure-redistributing surfaces ($\chi^2 = 2.302$; p = 0.094). However, there is a tendency for patients showing signs of intolerance to sitting to make greater use of pressure-redistributing surfaces (Table 9).

Table 9

Pressure redistribution according to sitting intolerance (Chi-Square Test)

Sitting Intolerance		Use of Pressure-Redistributing Surfaces		Total
		No	Yes	
No	**n.**	36	31	67
	%	54,00	46,00	100,00
Yes	**n.**	15	24	39
	%	38,00	62,00	100,00

(Chi-Square Test = 2,302; p=0,094)

We observed in the results that there were no significant differences in patients' sitting time as a function of the available resources, both regarding material resources (U = 862.5; p = 0.788) and human resources (U = 838.5; p = 0.614), as presented in Table 10.

Table 10

Sitting time according to material and human resources (Mann–Whitney U Test)

	Performed Sitting (n=85)				Did Not Perform Sitting (n=21)				Mann-Whitney U test	
	Mean Rank	M	SD	Med	Mean Rank	M	SD	Med	U	*p*
Material Resources	53,85	2,34	0,61	2,00	52,07	2,29	0,64	2,00	862,50	0,788
Human Resources	54,14	1,86	0,54	2,00	50,93	1,81	0,75	2,00	838,50	0,614

M – Mean; SD – Standard Deviation ; Med – Median

DISCUSSION

The results indicate that, in most caregiving experiences involving dependent patients reported by nursing students, patients were able to achieve elevation of all four limbs against gravity, as measured by the Medical Research Council (MRC) scale. Patients with greater upper and lower limb strength were more frequently able to assume a sitting position, with statistically significant differences observed for both upper and lower limbs. These findings are consistent with the work of Suchomel et al. (2018), who highlight muscular strength as one of the primary determinants of functional capacity in various motor tasks, including changes in body position, such as sitting. Strength in the upper and lower limbs is directly related to the ability to perform movements against gravity, such as standing up, sitting down, and maintaining postural balance, particularly in clinical and geriatric populations.

Regarding the complexity of nursing interventions required to achieve sitting positioning in an armchair, the experiences reported by nursing students indicate

that intervention complexity increases inversely with patients' muscle strength. As muscle strength decreases, increasingly complex interventions are required, including the use of assistive devices such as hydraulic lifts for patients with reduced muscle strength. Statistically significant differences were observed for both upper and lower limbs. These findings are aligned with the study conducted by Kumar et al. (2022), which, through computational simulations and musculoskeletal modelling, demonstrated that as muscle strength decreases, progressively more complex assistance is required to safely achieve sitting positioning. When muscle strength reduction reached 80%, sitting positioning without external support was no longer feasible, highlighting the need to adapt sitting interventions according to muscle strength to enhance safety for both patients and healthcare professionals.

The reported caregiving experiences also revealed that patients who exhibited signs of intolerance during sitting remained seated, on average, for a shorter duration than those who did not exhibit such signs, with statistically significant differences observed. This finding points to a relevant functional limitation, often associated with haemodynamic instability, orthostatic hypotension, or generalised discomfort, which compromises prolonged sitting tolerance. These results are supported by the findings of Teixeira et al. (2023), who demonstrated that sitting is generally well tolerated by patients, allowing them to remain seated for periods beneficial to haemodynamic stability and the prevention of complications associated with immobility. However, when signs of intolerance occur, reducing or interrupting the duration of sitting is recommended to prevent clinical deterioration.

This reinforces the importance of individualised assessment of tolerance to mobilisation and requires close and adaptive monitoring by nurses, with a focus on patient safety and intervention effectiveness. Thus, the presence of signs of intolerance should be regarded as a key clinical indicator for adapting nursing interventions during mobilisation, particularly with respect to sitting. Decisions to prolong, interrupt, or postpone sitting should be based on ongoing assessment of clinical parameters and patient responses, enabling the development of a holistic care plan that minimises risks while maximising therapeutic benefits.

The results also indicate a tendency for patients exhibiting signs of sitting intolerance to make more frequent use of pressure-redistributing surfaces. Although this relationship did not reach statistical significance, it raises relevant questions for nursing practice, particularly regarding the criteria for prescribing pressure-redistributing surfaces and how they are integrated into individualised care plans.

According to the data obtained, no statistically significant differences were observed in the reported caregiving experiences with respect to performing sitting positioning in an armchair based on the availability of human and material resources. Despite Rønning et al. (2024) emphasizing the availability of human and material resources as a highly relevant factor for performing sitting—contradicting the present findings—these authors also highlight other determinants they consider more influential, such as the normalization of prolonged bed rest and the devaluation or lack of prioritization of sitting positioning. These cultural and organizational factors may lead to the non-performance of sitting even when

resources are available, reinforcing the need to revalue sitting as a fundamental aspect of patient care. Training and awareness initiatives should therefore be implemented to promote this essential intervention.

CONCLUSION

This study highlights the relevance of sitting positioning as a fundamental intervention in preventing complications associated with immobility in partially or totally dependent patients. Data derived from caregiving experiences suggest that sitting is significantly associated with patients' upper and lower limb strength, with patients exhibiting greater strength remaining seated for longer periods and presenting a lower incidence of signs of intolerance.

Reported nursing interventions were, in most cases, adapted to patients' levels of dependence, increasing in complexity as muscle strength declined. This finding demonstrates an appropriate alignment of clinical practice with individual patient needs. Nevertheless, despite this adaptation, a considerable proportion of patients experienced signs of intolerance during sitting, underscoring the importance of continuous, systematic, and rigorous assessment by nurses to tailor sitting duration and frequency to each patient's individual tolerance, thereby preventing the emergence of such signs.

Additionally, the reported experiences revealed a tendency for patients with signs of intolerance to more frequently use pressure-redistributing surfaces, although this trend was not statistically significant. This finding suggests the need to reassess the criteria used for prescribing these surfaces, promoting a more individualised, preventive, and evidence-based approach.

The absence of statistically significant differences between the availability of human and material resources and the performance of sitting raises important reflections regarding care organisation and management. It highlights the importance not only of resource availability but also of their adequacy, accessibility, and practical applicability within clinical settings. Other determining factors, such as the lack of prioritisation of sitting by healthcare professionals or the normalisation of prolonged bed rest, should be considered, reinforcing the need for targeted training and awareness initiatives to promote this intervention, which, despite its apparent simplicity, offers substantial benefits for patients.

Despite the limitations of this study, namely, the reduced sample size, lack of randomisation limiting the generalizability of findings, and reliance on retrospective self-reported experiences by nursing students rather than direct observation, with potential subjectivity, this work underscores the relevance of personalising nursing care. Ensuring that interventions are tailored to each patient's specific needs remains essential. The appropriateness of sitting should be continuously re-evaluated based on functional status, physiological responses, and resource availability and management. Nurses play a central role in promoting mobility, preventing complications associated with immobility, and ensuring the delivery of holistic and humanised care.

Future research is recommended to focus on the implementation of strategies that ensure appropriate sitting positioning, resource allocation, and sitting duration based on prior assessment of patients' levels of dependence, with the aim of optimising outcomes

and improving the quality of care provided to individuals with limited mobility.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

REFERENCES

Alves, A., Bonito, C., Costa, I., João, I., & Gaspar, P. (2024). Uso do trapézio no apoio à mobilidade – uma perspetiva da enfermagem. *Revista de Investigação & Inovação em Saúde, 7*(3), 1-12. https://riis.essnortecvp.pt/index.php/RIIS/article/view/413/452

Amorim, J. (2021). Um estudo acerca da síndrome do imobilismo em pacientes idosos: mobilização precoce e eletroestimulação. *Revista Brasileira de Fisioterapia, 25*(1), p. 45-60. https://revistaft.com.br/um-estudo-acerca-da-sindrome-do-imobilismo-em-pacientes-idosos-mobilizacao-precoce-e-eletroestimulacao/

Araújo, F., Pais Ribeiro, J. L., Oliveira, A., & Pinto, C. (2007). Validação do Índice de Barthel numa amostra de idosos não institucionalizados. *Revista Portuguesa de Saúde Pública, 25*(2), 59–66. https://run.unl.pt/bitstream/10362/95522/1/05.pdf

Baptista, A. (2017). *Prevenção das complicações da imobilidade no doente crítico: o papel do enfermeiro especialista em enfermagem de reabilitação* [Dissertação de Mestrado, Escola Superior de Enfermagem de Lisboa]. Repositório Comum. http://hdl.handle.net/10400.26/18953

Bisset, I. (2017). The effect of bed rest on older people. *Age and Ageing*, *46*(2), 325-329. https://doi.org/10.1093/ageing/afw232

Cakmak, A. (2023). Adaptation of the musculoskeletal system to exercise. In D. K. Utlu (Ed.), *Functional exercise anatomy and physiology for physiotherapists* (pp. 373–389). Springer. https://doi.org/10.1007/978-3-031-27184-7_18

Cerqueira, A., & Grilo, E. (2019). Prevenção das consequências da imobilidade na pessoa em situação crítica. *Revista Portuguesa de Enfermagem de Reabilitação, 2*(1), 78-89. https://doi.org/10.33194/rper.2019.v2.n1.10.4574

Figueiredo, M., Freire, M., Pontes, M., Araújo, C., & Monteiro, E. (2024). Imobilidade e síndrome da imobilidade: implicações para a saúde da pessoa idosa. *Enferm Foco, 15*, e-202441. https://enfermfoco.org/article/imobilidade-e-sindrome-da-imobilidade-implicacoes-para-a-saude-da-pessoa-idosa/

França, E. É. T. D., Ferrari, F., Fernandes, P., Cavalcanti, R., Duarte, A., Martinez, B. P., Aquim. E.E.& Damasceno, M. C. P. (2012). Fisioterapia em pacientes críticos adultos: recomendações do Departamento de Fisioterapia da Associação de Medicina Intensiva Brasileira. *Revista Brasileira de Terapia Intensiva, 24*(1), 6-22. https://doi.org/10.1590/S0103-507X2012000100003

Guedes, L., Oliveira, M., & Carvalho, A. (2018). Efeitos deletérios do tempo prolongado no leito nos sistemas corporais dos idosos – uma revisão. *Revista Brasileira de Geriatria e Gerontologia, 21*(04). https://doi.org/10.1590/1981-22562018021.170167

Holstein, J. M., & Castro, A. A. M. (2021). Benefícios e métodos da mobilização precoce em UTI: uma revisão sistemática. *Lifestyle Journal*, 6(2), 7–22. https://doi.org/10.19141/2237-3756.lifestyle.v6.n2.p7-22

International Council of Nurses. (2019). *CIPE*. https://www.icn.ch/icnp-browser

Knight J, Nigam Y, & Jones A. (2009a). Effects of bedrest 1: cardiovascular, respiratory and haematological systems. *Nursing Times, 105*(21), 16-20. http://www.ncbi.nlm.nih.gov/pubmed/19548502

Knight J, Nigam Y, & Jones A. (2009b) Effects of bedrest 2: gastrointestinal, endocrine, renal, reproductive and nervous systems. *Nursing Times, 105*(22), 24-27. https://pubmed.ncbi.nlm.nih.gov/19579399/

Kumar, V., Yoshiike, T., & Shibata, T. (2022). Predicting sit-to-stand adaptations due to muscle strength deficits and assistance trajectories to complement them. *Frontiers in Bioengineering and Biotechnology, 10*, 799836. https://doi.org/10.3389/fbioe.2022.799836

Lima, A., & Ferreira, M. (2016, março, 10-12). *A reabilitação e a independência funcional do doente sujeito a imobilidade* [Presentation]. II Congresso Internacional de Enfermagem de Reabilitação 2016 "A Pessoa, Função e Autonomia – Reabilitar nos Processos de Transição no Ciclo de Vida", Coimbra. https://www.researchgate.net/publication/338374466_A_Reabilitacao_e_a_Independencia_Funcional_do_doente_sujeito_a_Imobilidade

Marusic, U., Narici, M., Simunic, B., Pisot, R., & Ritzmann, R. (2021). Nonuniform loss of muscle strength and atrophy during bed rest: a systematic

review. *Journal of Applied Physiology, 131*(1), 194-206. https://doi.org/10.1152/japplphysiol.00363.2020

Mesquita, T. M. D. J. C., & Gardenghi, G. (2016). Imobilismo e fraqueza muscular adquirida na unidade de terapia intensiva. *Revista Brasileira de Saúde Funcional, 4*(2), 47. https://doi.org/10.25194/rebrasf.v4i2.717

Nascimento, G., Silva, E., Oliveira, Y., Pereira, T., & Cabral, R. (2016). Atuação da fisioterapia na síndrome do imobilismo no idoso: uma revisão de literatura. *Anais I CNEH*. Realize Editora. https://editorarealize.com.br/artigo/visualizar/24359

Nigam Y, Knight J, Jones A. (2009). Effects of bedrest 3: musculoskeletal and immune systems, skin and selfperception. *Nursing times, 105*(23), 18-22. https://www.researchgate.net/publication/26687584_Effects_of_bedrest_3_musculoskeletal_and_immune_systems_skin_and_self-perception

Orem, D. E. (1971). *Nursing: concepts of practice*. McGraw-Hill.

Perme, C., Nawa, R., Winkelman, C. and Masud, F.(2014). A tool to assess mobility status in critically ill patients: the Perme Intensive Care Unit Mobility Score. *Methodist DeBakey Cardiovascular Journal, 10*(1), 41–49. https://doi.org/10.14797/mdcj-10-1-41

Pires, F. C., Vilela, L., de Moraes Pereira, C. B., Ruiz, M. T., Ohl, R. I. B., & Chavaglia, S. R. R. (2021). Instrumentos para a avaliação do nível de consciência em adultos e idosos: revisão integrativa. *Revista Enfermagem UERJ, 29*, e57053-e57053. http://dx.doi.org/10.12957/reuerj.2021.57053

Reis, S., Castro, E. R. M., Carvalho, S. I. P., Carvalho, S. Z. F., Fernandes, C. S., & Martins, M. M. F. P. S. (2021). Mobilização precoce de doentes na Unidade de Cuidados Intensivos: contributo para a enfermagem de reabilitação. Uma revisão sistemática da literatura. *Revista Portuguesa de Enfermagem de Reabilitação, 4*(1), 23–30. https://doi.org/10.33194/rper.2021.v4.n1.151

Rønning, M., Pedersen, C. L., & Kirkevold, M. (2024). Hospital-induced immobility – a backstage story of lack of chairs, time, and assistance. *BMC Geriatrics, 24*(1), 526. https://doi.org/10.1186/s12877-024-05286-6

Santos, M. E., Fernandes, D. S., Silva, M. P., Matiello, F. B., Braga, P. G., Cervantes, E. R., & Rodrigues, R. A. P. (2023). Instruments used in the assessment of functional capacity, frailty and sarcopenia in the elderly: integrative review. *Cogitare Enfermagem, 28*, e89719. https://doi.org/10.1590/ce.v28i0.89719

Schütz, L. A. (2019). Efeitos de um protocolo de mobilização precoce no controle de tronco em pacientes críticos. *Biblioteca Virtual em Saúde*. https://pesquisa.bvsalud.org/portal/resource/pt/biblio-1046829

Severino, S. (2016). Enfermagem de reabilitação à pessoa submetida a ventilação mecânica. In C. Marques-Vieira, & L. Sousa (Coords.), *Cuidados de enfermagem de reabilitação à pessoa ao longo da vida* (pp. 365-380). Lusodidacta. https://www.researchgate.net/publication/312041984_Enfermagem_de_Reabilitacao_a_Pessoa_Submetida_a_Ventilacao_Mecanica

Silva, D. V., & Ferretti-Rebustini, R. E. L. (2022). *Evidências de validade do Índice de Katz e da Escala de Lawton e Brody em idosos participantes de um centro de promoção à saúde* [Tese de Doutorado, USP - Universidade de São Paulo]. Biblioteca Digital de Teses e Dissertações da USP. https://doi.org/10.11606/T.7.2022.tde-11112024-164613

Suchomel, T. J., Nimphius, S., Bellon, C. R., & Stone, M. H. (2018). The importance of muscular strength: training considerations. *Sports Medicine, 48*, 765–785. https://doi.org/10.1007/s40279-018-0862-z

Teixeira, M., Sousa, I., & Silva, E. (2023). Efeitos hemodinâmicos da sedestação fora do leito em pacientes acamados hospitalizados. *Revista Brasileira de Reabilitação e Atividade Física, 12*(2), 49–59. https://estacio.periodicoscientificos.com.br/index.php/rbraf/article/view/2290

Thielo, L. F., Quintana, L. D., & Rabuske, M. (2020). Protocolo fisioterapêutico com base na escala Perme Intensive Care Unit Mobility Score para doentes críticos. *ASSOBRAFIR Ciência, 11*, e42249. https://doi.org/10.47066/2177-9333.AC.2020.0009

Wall, B., Dirks, M., Snijders, T., Senden, J., Dolmans, J., & Loon, L. (2014). Substantial skeletal muscle loss occurs during only 5 days of disuse. *Acta Physiol. 210*(3), 600-611. https://doi.org/10.1111/apha.12190