

## Use of the trapeze bar to support mobility - A nursing perspective

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### Abstract

**Background:** assistive devices, as the trapeze bar, are designed to enhance functional capacity of individuals with deficits and improve/maintain their physical functionality and independence in daily activities, as transfers and ambulation.

**Objectives:** to characterize the patient's level of dependency, to ascertain if nursing interventions are adjusted to patient's needs, and to determine if provision and use of the trapeze bar is appropriate for the patient.

**Methodology:** a quantitative, cross-sectional, correlational study. Data collection was conducted using a Google Forms questionnaire.

**Results:** a non-random sample of 100 individuals, with an average degree of severe dependency (Barthel Index), of which 76 (76.00%) had a trapeze bar and 24 (24.00%) did not. The results suggest that nursing interventions are adjusted to the level of dependency of the patients, especially in supporting transfers. Not all beds of dependent patients are equipped with trapeze bars, and the provision of trapeze bars does not appear to be adjusted to the level of dependency. When trapeze bars are present, they are used correctly and frequently, demonstrating their necessity and utility.

**Conclusion:** the distribution of trapeze bars is not ideal, being done in an apparently random manner and not considering the needs of the patients in the sample.

**Keywords:** rehabilitation; nursing; secondary prevention

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## Introduction

The consequences of immobility, resulting from functional inactivity, have a significant impact on nursing work, requiring a specialized approach to prevention. Nurses play a crucial role in early identification of the risks of immobility and implementation of interventions to minimize these adverse effects. They assess patients' levels of dependence and identify their specific needs, implementing appropriate interventions, such as using the trapeze bar.

The trapeze bar is essential for preventing sequelae in patients with reduced mobility, allowing safe movements and position changes. Despite its importance, the trapeze bar is not always available in patient beds, and when it is available, it is not always used.

Analyzing the availability and appropriate use of trapeze bars can significantly contribute to better nursing practices by providing information on how these devices can improve patient mobility and safety. This could lead to the implementation of more effective protocols for preventing pressure injuries and promoting early rehabilitation, resulting in better patient outcomes.

This study aims to answer the following research questions: How appropriate is the use/provision of trapeze bar equipment for the patient's level of dependence? And what is the agreement between the patient's level of dependence and nursing interventions?

## Background

Immobility is characterized by limited joint movements, loss of functional capacity, difficulty in postural changes, and body transfer (Cerqueira & Grilo, 2019). It is evident that immobility significantly impacts the quality of life, exacerbates social isolation (Antunes, 2022), and has economic repercussions for the individual with immobility and those who interact with him (Batista et al., 2019). Immobility also substantially impacts human physiology, as it is associated with complications such as loss of bone and muscle mass, which results in decreased muscle strength and joint range of motion. Cardiorespiratory, gastrointestinal, and urinary alterations also occur, as well as atelectasis, pneumonia, thromboembolic episodes, and pressure injuries (Sousa & Carvalho, 2017).

Pressure injuries are one of the most frequent sequelae of immobility and involve significant costs for patients, healthcare services, and society in general (Gaspar et al., 2010). According to Kawther et al. (2022), these injuries are a problem associated with restricted mobility, developing as a consequence of pressure applied to the skin surface, particularly over bony prominences. The elderly population is more susceptible to developing pressure injuries, as ageing-related changes significantly impact the healing process due to reduced skin elasticity and collagen concentration, compromising skin integrity (Jayakumar et al., 2021, cited by Kawther et al., 2022). Considering the negative effects associated with pressure injuries, such as decreased physical, social, and functional well-being, they should be prevented through measures that promote skin care, including the use of manual handling aids, such as trapeze bars (Kawther et al., 2022).

The nurse's role centers on preventing and managing pressure injuries by identifying and addressing risk factors (Prakash & Prakash, 2019). Additionally, nurses encourage patients to stay active and participate in regular position changes, ideally every hour (Kawther et al., 2022).

The role of the nurse is crucial in preventing complications associated with immobility (Sayed & Sliman, 2021). The regulation of professional nursing practice in Portugal, established by Decreto-Lei n.º 161/1996, outlines the objectives of nursing, which include health promotion, disease prevention, treatment, rehabilitation, and social reintegration. Nurses provide care based on the patient's level of dependency, taking over the functional abilities of fully incapacitated patients and assisting partially incapacitated patients in

enhancing their functional capabilities. Furthermore, Regulamento n.º 392/2019 details the specific competencies required for specialist nurses in Rehabilitation Nursing. It highlights the vital role these professionals play in preventing complications from immobility through various interventions, including assessing patients, prescribing treatments, and utilizing assistive devices.

Rehabilitation nursing aims to prevent complications that can arise from reduced mobility, while also striving to maintain and improve muscle strength and mobility. It promotes motor recovery, teaches proper use of assistive devices, and helps individuals adapt their mobility to participate in social activities, all of which contribute to overall well-being (Marques-Vieira & Sousa, 2016, as cited in Moreira et al., 2020). By focusing on enhancing quality of life, rehabilitation nursing care seeks to restore functionality, maximize individual capabilities, and encourage self-care (Ordem dos Enfermeiros [OE], 2014, as cited in Diz, 2021).

The nurse plays a vital role in ensuring the continuity of care between the hospital and the community. It is essential to select interventions that empower individuals and their families or caregivers for self-care, as this is crucial for helping individuals adapt to their new health conditions and for preventing complications (Ferreira et al., 2019). Additionally, it is important to emphasize that prevention is as significant as treatment. Healthcare professionals should promote preventive strategies to patients and their families or caregivers (Prakash & Prakash, 2019). Assistive products are devices specifically designed to enhance the functional capacity of individuals with limitations. These devices aim to improve and maintain the physical functionality and independence of patients, allowing them to perform daily activities such as transfers and ambulation. They also help conserve energy, promote comfort, prevent falls, and enhance independence in self-care (Iolascon et al., 2021). When transferring patients with mobility restrictions, it is crucial to use assistance, whether from another healthcare professional or with the help of assistive products. This is essential in preventing complications related to immobility (Diz, 2021). The trapeze bar is an example of an assistive product used for transfer and position changes (Despacho n.º 7197/2016). Utilizing the trapeze bar facilitates bed mobility, especially in transitioning from a lying to a sitting position (Coman & Caponecchia, 2023; Iolascon et al., 2021).

Patients who are confined to bed are at a higher risk of developing pressure ulcers. To mitigate this risk, they should shift their weight whenever they experience discomfort, as this practice helps reduce the potential for tissue damage (Prakash & Prakash, 2019). Those with upper body strength can use aids such as a trapeze bar to reposition themselves (Alexandre & Rogante, 2000; Prakash & Prakash, 2019). Even patients who cannot fully change positions should utilize the trapeze bar to enhance their mobility in bed (Iolascon et al., 2021). Healthcare professionals guide and motivate patients to perform upper body strengthening exercises with the bed trapeze bar (Antunes, 2022). Teaching patients how to use the trapeze bar not only improves their physical condition but also increases their independence with transfers and daily living activities (Henriques & Fumincelli, 2017; Ordem dos Enfermeiros, 2013).

## **Methodology**

This study is a cross-sectional correlational quantitative research. The target population includes patients who are hospitalized in the locations where Nursing Bachelor's students receive their training. The sample is based on convenience, consisting of 100 patients with varying degrees of dependency, who received care from the students during their final clinical training as they transition into professional practice. Data collection was conducted between February and May 2024 using a Google Forms questionnaire. This questionnaire includes questions regarding the patient's level of dependency, the presence and use of a trapeze bar, and nursing interventions aimed at preventing immobility-related complications. The first section outlines

its context and objectives, assures participants that all collected data will remain confidential, and requests informed consent. The second section allows participants to indicate the Clinical Training program they are currently undertaking. The third section utilizes the Barthel Index to assess the patient's level of dependency. This instrument evaluates the degree of independence in performing ten daily activities, which include feeding, transfers, toileting, using the restroom, bathing, mobility, climbing and descending stairs, dressing, bowel control, and urinary control (Araújo et al., 2007). Higher scores indicate a greater degree of independence. The fourth section details nursing interventions aimed at preventing the consequences of immobility, based on the "Nursing Interventions Scale for the Prevention of Immobility Sequelae" (IEPSI). This scale was developed and validated specifically for this study and originally consists of 17 items, as outlined in the International Classification for Nursing Practice (International Council of Nurses, 2019). These items are formulated as Likert-type questions, ranging from "Never" (1 point) to "Very Frequently" (5 points). Higher scores reflect more frequent application of these interventions. The fifth section includes questions about the availability and utilization of the trapeze bar, as well as the reasons for its use or non-use.

All data were collected with a focus on confidentiality and anonymity for all participants, solely for the purpose of statistical analysis. The study received approval from an ethics committee. Statistical analysis was conducted using the Statistical Package for the Social Sciences (SPSS version 30.0.0). We employed descriptive statistics, including absolute and relative frequencies, means, and standard deviations, as well as inferential statistics, such as Spearman correlations and Chi-Square tests. Non-parametric tests were chosen due to the non-normal distribution of the sample, as determined by the Kolmogorov-Smirnov test. Additionally, we analyzed item homogeneity statistics and internal consistency coefficients (Cronbach's Alpha) of the IEPSI Scale (Gaspar & Shimoya, 2017).

## Results

The sample comprises 100 individuals, of which 58 (58%) are male. The majority of the data, 85 forms (85%), were collected during Clinical Training VIII, which occurs at the end of the eighth semester of the Nursing Bachelor's program. The ages of the participants range from 20 to 92 years, with a mean age of 71.66 years and a standard deviation of 17.41 years. Table 1 illustrates the assessment of the sample's degree of dependency as measured by the Barthel Index. The results indicate that the sample exhibits a higher level of dependency in the following parameters: Feeding, Bathing, Toilet use, Grooming, Stair negotiation, Dressing, Bowel Control, Bladder Control, and Bed-to-chair-and-back transfers. In contrast, the parameter of Mobility on level surfaces shows a moderate level of dependency.

Table 1 Assessment of the degree of dependence (Barthel Index) for the sample (n = 100)

Barthel Index	0	5	10	15	M	DP
Feeding	Unable	With help	Independent		4,10	3,92
Bed-to-chair-and-back transfers	Unable	Lots of help	Some help	Independent	5,20	5,22
Toilet use	With help	Independent			1,20	2,15
Grooming	Dependent	With help	Independent		2,65	3,44
Bathing	Dependent	No help			0,55	1,57
Mobility on level surfaces	Imobility	Independent in Wheelchair	With help	Independent	5,05	6,01
Stair negotiation	Unable	With help	Independent		2,20	3,43
Dressing	Dependent	With help	Independent		2,80	3,58
Bowel control	Incontinence	Occasional Accidents	No problems		4,35	4,42

Bladder control	Incontinence or Urinary Catheter	Occasional Problems	Continence	4,05	4,42
TOTAL				32,15	31,21

Table 2 reflects the item homogeneity statistics and internal consistency coefficients (Cronbach's Alpha) of the IEPSI Scale.

The items corresponding to the nursing interventions "Promoting Physical Mobility" (mean 3.90, standard deviation 1.08); "Assessing Mobility" (mean 4.08, standard deviation 1.11); "Assisting with mobility" (mean 3.88, standard deviation 1.37); "Assisting mobility in bed" (mean 3.99, standard deviation 1.34); "Turning patient" (mean 3.75, standard deviation 1.45); and "Positioning Patient" (mean 3.86, standard deviation 1.41) were the highest scored, indicating that these activities were performed more frequently.

The items corresponding to the nursing interventions "Assisting With Walking" (mean 2.32, standard deviation 1.46); "Training mobilising device use" (mean 2.37, standard deviation 1.32); "Assisting With Walking Using Device" (mean 1.74, standard deviation 1.23); "Promoting Walking Using Device" (mean 1.76, standard deviation 1.25); and "Increasing Activity Tolerance" (mean 2.33, standard deviation 1.16) were the lowest scored, indicating that these activities were performed less frequently. The Cronbach's Alpha values range from 0.896 to 0.911 for the items and 0.908 for the total scale (table 2).

Table 2 Homogeneity of items and internal consistency coefficients of the IEPSI scale

Items	Limits	Mean	Std. Deviation	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1 [Promoting Physical Mobility]	1-5	3,90	1,08	0,584	0,903
2 [Assessing Mobility]	1-5	4,08	1,11	0,565	0,903
3 [Assisting With Mobility]	1-5	3,88	1,37	0,669	0,900
4 [Assisting With Mobility in bed]	1-5	3,99	1,34	0,380	0,908
5 [Turning patient]	1-5	3,75	1,45	0,290	0,911
6 [Positioning Patient]	1-5	3,86	1,41	0,282	0,911
7 [Transferring Patient]	1-5	3,10	1,52	0,606	0,902
8 [Assisting With Walking]	1-5	2,32	1,46	0,521	0,904
9 [Guiding mobilising device use]	1-5	3,21	1,60	0,739	0,897
10 [Demonstrating mobilising device use]	1-5	2,61	1,38	0,733	0,898
11 [Training mobilising device use]	1-5	2,37	1,32	0,729	0,898
12 [Promoting mobilising device]	1-5	3,44	1,65	0,747	0,896
13 [Assisting With Walking Using Device]	1-5	1,74	1,23	0,514	0,904
14 [Promoting Walking Using Device]	1-5	1,76	1,25	0,448	0,906
15 [Increasing Activity Tolerance]	1-5	2,33	1,16	0,549	0,903
16 [Optimising mobilising device use]	1-5	3,40	1,67	0,713	0,898
17 [Teaching mobilising device use]	1-5	2,61	1,38	0,757	0,897
TOTAL	17-85	52,35	14,96		0,908

Table 3 presents the correlation between Nursing Interventions for the Prevention of Immobility Sequelae (IEPSI) and the "Bed-to-chair-and-back transfers" activity of the Barthel Index. Spearman correlations were utilized because not all the variables studied followed a normal distribution, as determined by the Kolmogorov-Smirnov test. The interventions "Assisting With Mobility in bed" ( $\rho = -0.525$ ), "Turning Patient" ( $\rho = -0.638$ ), and "Positioning Patient" ( $\rho = -0.645$ ) show statistically significant moderate negative

correlations. This indicates that as patients become more dependent on assistance with transfers, these nursing interventions are performed more frequently. Conversely, the intervention “Transferring Patient” has a rho value of -0.115, which corresponds to a negligible negative correlation (Mukaka, 2012).

Table 3 Correlation of the IEPSI scale with the “Bed-to-chair-and-back transfers” activity of the Barthel Index

Nursing interventions (IEPSI)	Bed-to-chair-and-back transfers (Barthel Index)		
	rho	Interpretation	p
Assisting With Mobility in bed	-0,525	Moderate negative	0,000
Turning patient	-0,638	Moderate negative	0,000
Positioning Patient	-0,645	Moderate negative	0,000
Transferring Patient	-0,115	Negligible negative	0,256

*rho – Spearman correlations*

Table 4 outlines the findings regarding the availability and usage of the trapeze bar among the sample of 100 individuals. Out of the total, 76 participants (76.00%) had access to a trapeze bar, while 24 participants (24.00%) did not. Of those who possessed a trapeze bar, 50 individuals (65.79%) utilized it, whereas 26 individuals (34.21%) did not. Among the 24 patients without a trapeze bar but who needed one, no attempts were made to provide this equipment (100.00%). For those who had a trapeze bar available, it was used by 35 individuals for lifting, 31 for transfers, and 49 for bed mobility. Among the 26 patients who did not use the trapeze bar despite its availability, 6 did not require it, while 20 were unable to use it.

Table 4 Availability and usage of the trapeze bar

Availability and usage of the trapeze bar	Yes	No
	n (%)	n (%)
Was the patient unit equipped with a trapeze bar? (n=100)	76 (76,00)	24 (24,00)
If so, was the trapeze bar used? (n=76)	50 (65,79)	26 (34,21)
If the patient didn't have a trapeze bar and needed it, did you notice any measures to make it available to the patient? (n=24)	00 (-)	24 (100,00)
In what situations has the trapeze bar been used?	Lifting (n=35) Transfer (n=31) Mobility in Bed (n=49)	
If the trapeze bar was available but not in use, please explain why (n=26).	The patient did not need it (n=06) The patient was unable to do so (n=20)	

Table 5 illustrates the availability of trapeze bars based on patients' levels of dependency during transfers. The data reveals that among patients labeled as "dependent and unable to sit balanced," 32 individuals (82.1%) had access to a unit equipped with a trapeze bar. Among those who "need help from another person but cannot sit up," 21 patients (67.7%) had a unit with a trapeze bar. For patients who "need some help," 12 individuals (70.6%) had a trapeze bar-equipped unit. In the "independent" category, 11 patients (84.6%) had access to a trapeze bar. Overall, the percentage of beds with a trapeze bar is consistently higher than those without, regardless of the level of dependency. The percentage of beds lacking a trapeze bar varies, ranging from 32.3% for patients who "need help from another person but cannot sit up" to 15.4% for "independent" patients.

Table 5 Availability of the trapeze based on the level of dependence on transfers (Barthel Index)

Bed-to-chair-and-back transfers (Barthel Index)	Was the user unit equipped with a trapeze bar?		Total
	Yes n (%)	No n (%)	
Dependent, has no sitting balance	32 (82,10)	07 (17,90)	39 (100,00)
Needs help from someone else but can't sit down	21 (67,70)	10 (32,30)	31 (100,00)
Requires some assistance	12 (70,60)	05 (29,40)	17 (100,00)
Independent	11 (84,60)	02 (15,40)	13 (100,00)
TOTAL	76 (76,00)	24 (24,00)	100 (00,00)

*Chi-Square = 2,744; gl = 3; p= 0,433*

## Discussion

According to the Barthel Index, the average level of dependency in the sample is categorized as severe dependency (Araújo et al., 2007). This outcome may be partly attributed to the average age of the participants, which is 71.66 years with a standard deviation of 17.41 years. The aging process is naturally linked to changes that lead to a decline in physical abilities, resulting in higher health risks (Antunes, 2022). The most frequently implemented nursing interventions were “Turning patient” and “Positioning patient.” Proper positioning is a crucial strategy to reduce involuntary skin compression and prevent complications related to immobility, particularly pressure ulcers (Sayed & Sliman, 2021). Conversely, the least frequently applied interventions were “Teaching mobilising device use” and “Promoting Walking Using Device.”

The IEPsi scale demonstrated excellent reliability, with a Cronbach’s Alpha greater than 0.890. The results indicated that a higher degree of patient dependency, as evidenced by lower scores in the “Bed-to-chair-and-back transfers” activity on the Barthel Index, was associated with an increased frequency of interventions such as “Assisting With Mobility in bed”, “Turning patient,” and “Positioning Patient.” This suggests an inverse relationship between the two variables. The implementation of nursing interventions is crucial in preventing the negative effects of immobility (Sayed & Sliman, 2021). Most patient units included in the sample were equipped with a trapeze bar, and the majority of patients with access to a trapeze bar utilized it primarily for bed mobility. These findings underscore the effectiveness of the trapeze bar as an assistive device for patients with varying degrees of disability and/or dependency. The trapeze bar is advantageous for positioning in bed and serves as support during transfers (Coman & Caponecchia, 2023).

Among the patients who had access to a trapeze bar but did not use it, most were unable to do so. Conversely, for those who needed a trapeze bar but did not have one, no attempts were made to provide it. This observation underscores the necessity for a more proactive approach by nurses in offering the trapeze bar as a vital assistive device to promote mobility and prevent the complications associated with immobility (Antunes, 2022; Regulamento n.º 392/2019).

Most patients had access to a trapeze bar; however, a significant percentage of those who needed one did not have it available. The results also indicate that there are no statistically significant differences between patients’ levels of dependency and the availability of a trapeze bar in their beds, as determined by the Chi-square test. This suggests that the distribution of trapeze bars may have occurred randomly within patient units, rather than being based on a prior assessment of their suitability and utility (Decreto-Lei n.º 161/1996; Regulamento n.º 392/2019). Appropriate placement of trapeze bars in beds, aligned with patients’ levels of dependency, is crucial for promoting mobility and autonomy. Assistive devices like trapeze bars facilitate movement and transfers, thereby reducing injury risks for both patients and healthcare professionals (Alexandre

& Rogante, 2000). Moreover, the use of trapeze bars enables patients to engage actively in their transfers and position changes, which fosters their autonomy and accelerates the rehabilitation process. It is recommended that nursing practices include regular assessments of patients' dependency levels and the provision of suitable trapeze bars. Additionally, continuous training for healthcare professionals on the correct use of these devices is essential to maximize the benefits for patients (Ordem dos Enfermeiros, 2013).

## Conclusion

This study highlights the crucial role of nurses in preventing complications related to immobility in patients who are highly dependent. To effectively address these needs and decrease the level of dependency, it is essential to implement appropriate nursing interventions. This includes the use of assistive devices, such as trapeze bars, to enhance patient mobility.

The results indicate that nursing interventions are adapted to match the patients' levels of dependency, especially when it comes to providing support during transfers. This adjustment is essential for ensuring the safety and comfort of patients, as well as preventing injuries for both patients and healthcare professionals. Tailoring interventions based on individual dependency levels reflects a strong understanding of patients' specific needs and the effective application of evidence-based care.

A notable concern is that not all beds for dependent patients are equipped with trapeze bars, and the availability of these bars does not consistently match patients' levels of dependency. Trapeze bars are vital tools that assist patients with limited mobility in moving and repositioning themselves more easily. This functionality helps prevent pressure ulcers and other complications related to immobility, while also promoting patient autonomy. The lack of these assistive devices in some beds indicates a deficiency in essential resources, which may negatively impact the quality of care provided. To address this issue, it is essential to conduct a comprehensive assessment of patients' needs and allocate resources accordingly. This ensures that all beds are equipped with the necessary trapeze bars. Additionally, developing nursing protocols that standardize the regular evaluation of patients' dependency levels and the appropriate provision of trapeze bars is crucial. It is equally important to provide ongoing training for healthcare professionals on the proper use of these devices.

The data indicate that when trapeze bars are available, they are used correctly and frequently. This suggests that these devices are necessary and beneficial, and that the nursing staff is well-trained and aware of best practices. However, it is concerning that there are no proactive measures in place to ensure that all dependent patients have access to these important devices. The lack of action to address the absence of trapeze bars highlights the need for a review of management processes. A more systematic approach is required to identify and address equipment deficiencies. Implementing a continuous monitoring and feedback system could help quickly identify these gaps and allow for timely corrective actions, ensuring that all patients receive high-quality care tailored to their needs.

Although this study has limitations, such as a small sample size and a non-random design that hinder the generalization of results, it underscores the importance of individualizing nursing care to align interventions with each patient's specific needs. It is crucial to ensure consistency between the level of patient dependency and the nursing interventions applied. Notably, in this sample, there was often a lack of consistency between the need for a trapeze bar and its availability and usage. Future research should focus on strategies to guarantee the availability and effective use of trapeze bars, guided by prior assessments of patients' dependency levels. This approach aims to enhance outcomes and improve the quality of care for patients with reduced mobility.

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