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Rehabilitation pharmacotherapy and the impact of social vulnerability on access to medications

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ABSTRACT

Objective: To analyze the social vulnerability of patients admitted to a hospital rehabilitation unit and their access to medications through the Unified Health System (SUS) of the Federal District (DF). **Methods:** This was an observational, descriptive, cross-sectional study using retrospective data of 99 patients hospitalized between January and December 2022. Sociodemographic and clinical variables and the presence of prescribed medications in the essential medicine lists of the World Health Organization (WHO), National List of Essential Medicines (RENAME), and the Essential Medicines List of the Federal District (REME-DF) were analyzed. **Results:** Of the medications, 93 (76.2%) were included in the REME-DF, 71 (58.2%) in the RENAME, and 63 (51.6%) in the WHO list. Social vulnerability was observed in 63% of patients. **Conclusion:** The REME-DF covers the most essential medications for rehabilitation, aligned with the National Pharmaceutical Assistance Policy (PNAF). However, the organization of health services in the DF should be restructured to overcome the barriers faced by people with disabilities in accessing medications.

Keywords: Disability, Drug essential, Neurological rehabilitation, Social vulnerability.

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INTRODUCTION

In recent years, the demand for rehabilitation services has grown significantly, driven by increased life expectancy and the prevalence of noncommunicable chronic diseases (WORLD HEALTH ORGANIZATION, 2017). In Brazil, the Unified Health System (SUS) has sought to structure and expand access to these services through initiatives such as the National Health Policy for People with Disabilities and the implementation of Specialized Rehabilitation Centers (CER) (VALENTIM RS, et al., 2021).

However, challenges extend beyond the physical structure of care and include issues related to access to medications, particularly among the most vulnerable. These groups often need to rely on personal resources to obtain essential medications, which can negatively affect family income and compromise their health and well-being (OLIVEIRA LCF, et al., 2019).

In this context, the National Policy of Pharmaceutical Assistance (PNAF), which ensures universal and comprehensive access to medications within the SUS, plays a fundamental role in promoting health equity. PNAF defines guidelines for the selection, planning, procurement, storage, distribution, dispensing, and rational use of medications, to ensure adequate access to essential drugs (BRAZIL, 2004). Access to medications is fundamental to achieving universal health coverage (UHC), which is included in the United Nations Sustainable Development Goals (SDGs) (UNITED NATIONS BRAZIL, 2015).

Since the 1970s, the World Health Organization (WHO) has encouraged the adoption of national essential medicine lists (EMLs) to promote access to medications. In Brazil, the National List of Essential Medicines (RENAME), created in 1975, serves as an important guide for the use of medicines and supplies in the SUS (VIEIRA FS, 2010). However, the autonomy granted to states and municipalities to develop their own medication lists can lead to regional variations, compromising uniform access across the country (VIEIRA FS, 2010).

In addition to logistical barriers, the social determinants of health (SDH) significantly influence access to rehabilitation services and health technologies (WALLACE LMK, et al., 2014), affecting approximately 30–55% of health outcomes (WORLD HEALTH ORGANIZATION, [s.d.]). People with disabilities face additional challenges owing to increased social vulnerability in employment, education, and rehabilitation services. These factors exacerbate existing difficulties, necessitating the implementation of more effective public policies that promote inclusion and provide adequate support to these populations (FIORATI RC e ELUI VMC, 2015).

Ensuring access to healthcare is a complex process involving multiple dimensions such as accessibility, acceptance of services, availability, financial capacity, and alignment with patients' needs. Various studies have highlighted that these aspects must align with individual abilities, including health literacy, cultural beliefs, living conditions, and social support, to ensure truly effective and inclusive access (LEVESQUE J-F, et al., 2013; PENCHANSKY R e THOMAS JW, 1981). For instance, the absence of rehabilitation representation in the committees responsible for the national EML limits the integration of these needs into health policies (CONRADIE T, et al., 2022).

To the best of our knowledge, there is a gap in the literature evaluating the medications prescribed for neurological conditions and their inclusion in essential medicine lists (EZZIANE Z, 2014; NASCIMENTO RCRM, et al., 2017; ROCHA WH, et al., 2021) such as those of the WHO, RENAME, and the Federal District Medicines List (REME-DF). Unlike previous research (EZZIANE Z, 2014; NASCIMENTO RCRM, et al., 2017; ROCHA WH, et al., 2021), which primarily focuses on general access to medications, this study specifically addresses the alignment of these lists with the therapeutic needs of neurological rehabilitation.

Given this scenario, the present study aimed to analyze the social and economic vulnerabilities of patients admitted to a specialized rehabilitation unit in the Federal District (DF) of Brazil. Furthermore, it sought to explore the pharmacotherapy prescribed to this population at hospital discharge and investigate the availability of and access to medications provided by the SUS in the DF. Additionally, the study highlighted the barriers faced by socially vulnerable patients in accessing these treatments in the DF, providing critical insights for revising essential medicine lists and improving public policies to address the specific needs of this population.

METHODS

This descriptive, cross-sectional, retrospective study utilized data from patients admitted to the rehabilitation and long-term care unit at a public hospital in the DF, Brazil. The data were obtained through the computerized system of the State Health Secretariat of the Federal District (SES-DF), the Integrated Health System–SIS TrakCare®.

The sample included patients aged 18 years or above, admitted between January and December 2022 with motor function loss and/or cranial nerve impairment (affecting speech and swallowing) due to neurological injuries and subsequently discharged. Patients with incomplete data or communication disabilities were excluded.

The collected variables included age, sex, education level, place of residence, income range, social assistance benefits, social support network, social vulnerability, type of injury, and cause of injury. Medication information included the quantity and names of drugs prescribed at discharge according to the Brazilian Common Denomination (DCB), Anatomical Therapeutic Chemical (ATC) (NORWEGIAN INSTITUTE OF PUBLIC HEALTH, 2024) code and classification, pharmacological group, previous use, and presence in the EMLs of the WHO ("EMLs around the world", [s.d.]), the National List of Essential Medicines (RENAME) (BRAZIL, 2022), and the DF Essential Medicines List (REME-DF) (FEDERAL DISTRICT, 2024a).

Social vulnerability was assessed from social and economic perspectives by considering variables such as income range, social assistance benefits, and social support networks. The analysis used a classification developed by the hospital team based on the National Social Assistance Policy (2005) and the theories of Robert Castel (1997).

In this classification, social vulnerability was stratified into three complexity levels: low (individuals with their own income and preserved family and/or community ties, characterizing the integration zone), medium (individuals with their own but compromised income and weakened family and/or community ties, vulnerability zone), and high (individuals without income and with broken family ties, disaffiliation zone).

The data were collected by four researchers and reviewed by two others to minimize information loss and prevent data capture errors. This procedure enabled cross-verification, ensuring greater accuracy and reliability of the results. The data were analyzed using Excel® and Jeffreys's Amazing Statistics Program (JASP®). Descriptions of sociodemographic, clinical, and medication use data were obtained using frequency distribution and measures of central tendency and dispersion.

Medications were correlated with primary therapeutic indications, considering the following: (1) ATC classification (NORWEGIAN INSTITUTE OF PUBLIC HEALTH, 2024); (2) WHO indications for treating neurological conditions (WORLD HEALTH ORGANIZATION, 2023); (3) therapeutic indications of the clinical protocols and therapeutic guidelines of the Ministry of Health (BRAZIL, 2021); (4) therapeutic indications in the clinical protocols of SES-DF (FEDERAL DISTRICT, 2024b); e (5) indications in the Brazilian Stroke Rehabilitation Guidelines (MINELLI C, et al., 2022a, 2022b).

This study is part of the "Prescription patterns and sociodemographic characteristics of patients served in a Rehabilitation Referral Unit, in the Federal District" project, approved by the Research Ethics Committee with Human Beings of the Ceilândia Faculty, University of Brasília (CEP-FCE), under CAAE no. 71118923.3.0000.8093, opinion no. 6.253.569, and by the CEP of the Foundation for Teaching and Research in Health Sciences (FEPECS/SES/DF), under CAAE no. 71118923.3.3001.5553, opinion no. 6.322.702.

RESULTS

A total of 99 medical records were analyzed. The average length of hospital stay was 87.5 ± 50.3 days, with a median (interquartile range, IQR25%-75%) of 87.0 (54.5–114.5) days. The patients' ages ranged from 18 to 90 years, with a median (IQR25%-75%) of 48 (35–56) years. The sociodemographic and clinical characteristics of the patients are presented in **Table 1**.

Table 1 - Characteristics of patients hospitalized between January and December 2022 in the Rehabilitation and Long-Term Care Unit who were discharged (n=99).

Variables	n	%
Sex		
Male	71	71,7
Education level		
Complete elementary education	9	9,1
Incomplete elementary education	33	33,3
Complete high school education	23	23,3
Incomplete high school education	11	11,2
Complete higher education	13	13,1
Incomplete higher education	5	5
No schooling	5	5
Place of residence		
Other state	19	19,2
Federal district	80	80,8
Income range		
No income	17	17,1
Up to 1 minimum wage	30	30,3
Above 1 to 2 minimum wages	24	24,3
Above 2 to 3 minimum wages	15	15,2
Above 3 to 4 minimum wages	1	1
No data	12	12,1
Social assistance benefits		
No assistance or social security benefits	55	55,5
Social support network		
Strong	79	79,8
Weak	13	13,2
None	2	2
No data	5	5
Social vulnerability		
Low complexity	30	30,3
Medium complexity	37	37,4
High complexity	26	26,3
No data	6	6
Type of injury		
Traumatic spinal cord injury	40	40,4
Non-traumatic spinal cord injury	9	9

Variables	n	%
Traumatic brain injury	11	11,1
Non-traumatic brain injury	21	21,3
Peripheral injury	16	16,2
Other	2	2
Cause of injury		
Stroke	20	20,2
Infection	15	15,1
Fall from height	14	14,1
Car accident	14	14,1
Gunshot wound	11	11,2
Other	25	25,3

Note: n, % = absolute and relative frequency.
Source: Martins AN, et al., 2025.

A total of 867 medications were prescribed at discharge throughout 2022, with an average of 8.59 ± 3.06 medications per patient. **The Supplementary Material (Table 1)** describes the prevalence of prescribing each medication and its presence in the EMLs of the WHO, RENAME, and REME-DF.

To evaluate the treatment coverage of neurological conditions such as stroke, traumatic brain injury (TBI), and spinal cord injury (SCI) in the DF, documents published by the WHO, Ministry of Health (MS), and SES-DF were analyzed. The most frequently used medications and their availability in the DF are shown in **Table 2**.

Table 2 - Most frequently used medications to treat neurological conditions.

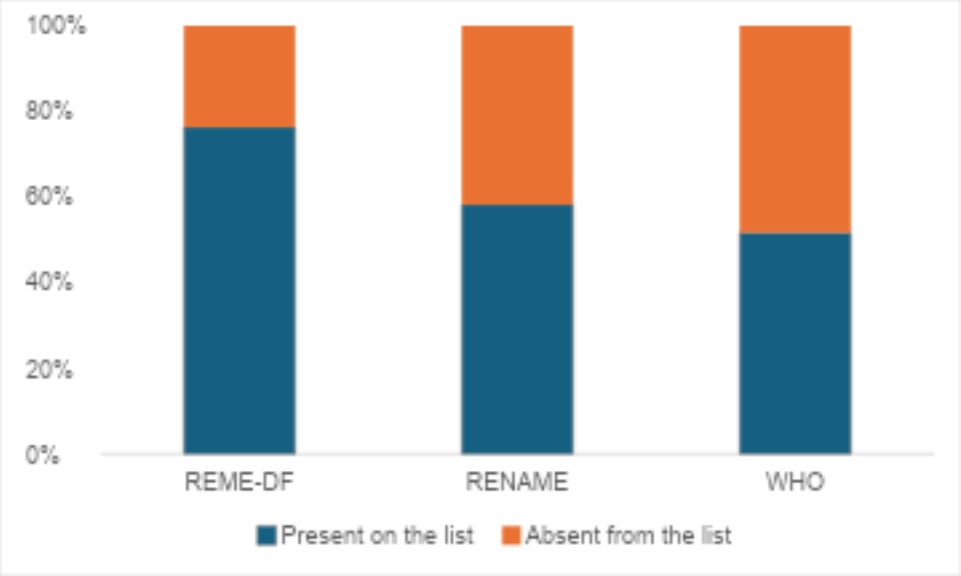
Clinical condition	Medication	Access to medication in the Federal District
Central pain		
	Amitriptyline[a,b,e]	Y
	Nortriptyline[e]	Y
	Fluvoxamine[a]	N
	Duloxetine [b]	N
	Lamotrigine[a]	Y
	Pregabalin[a]	N
	Gabapentin[a,e]	Y
Nociceptive pain		
	Nonsteroidal anti-inflammatory drugs (NSAIDs)[c,d]: Ibuprofen[b,e], Naproxen[e]	Y
	Non-opioid analgesics: Paracetamol[b,e], Dipyrone[e]	Y
	Intra-articular corticosteroids[b]	Y
	Codeine[e]	Y
	Morphine[e]	Y
	Methadone[e]	Y
Mood and behavioral disorders		
	Nortriptyline[a]	Y
	Trazodone[a]	N
	Citalopram[a,h]	Y
	Fluoxetine[a]	Y
	Reboxetine[a]	N
	Second generation antipsychotics[c]	Y

Clinical condition	Medication	Access to medication in the Federal District
Sleep disorders		
	Trazodone[a]	N
	Zolpidem[c]	N
	Zopiclone[c]	N
Epilepsy		
	Levetiracetam[a,f]	Y
	Lamotrigine[a,f]	Y
	Carbamazepine[a,f]	Y
Communication disorders: Aphasia, dysarthria, and apraxia of speech		
	Donepezil[a]	N
	Memantine[a]	N
Spasticity and spasms		
	Botulinum Toxin[a,b,c,d,g]	Y
	Phenol[d]	N
	Baclofen[a,b,c,d]	Y
	Dantrolene[c]	Y
	Tizanidine[a,b,c,d]	N
	Oral benzodiazepines[a,d]	Y
Upper limb motor rehabilitation		
	Cebrolysin[a]	N
	Citalopram[a]	Y
Cognition		
	Donepezil[a]	N
	Galantamine[a]	N
	Amantadine[c]	N
Intestinal dysfunction		
	Laxatives[b,c,d]	Y
Urinary dysfunction		
	Anticholinergics[b,d]	Y
	Botulinum Toxin [d]	Y
	Alpha-1 adrenergic blockers[d]	Y
Dysautonomia and orthostatic hypotension		
	Midodrine[c,d]	N
	Fludrocortisone[c]	N
Sexual dysfunction		
	Phosphodiesterase 5 (iF5) inhibitors[d]	Y
Autonomic dysreflexia		
	Glycerin trinitrate[d]	Y
	Captopril[d]	Y
	Nifedipine[d]	Y

Note: Y = yes, N = no
[a]Brazilian Stroke Rehabilitation Guidelines, Part I[18] and Part II[19]
[b]Rehabilitation Intervention Package for Stroke[36]
[c]Rehabilitation Intervention Package for Traumatic Brain Injury (TBI)[36]
[d]Rehabilitation Intervention Package for Spinal Cord Injury (SCI)[36]
[e]Clinical Protocols and Therapeutic Guidelines (PCDT/MS) – Chronic Pain[5]
[f]Clinical Protocols and Therapeutic Guidelines (PCDT/MS) – Epilepsy[5]
[g]Clinical Protocols and Therapeutic Guidelines (PCDT/MS) – Spasticity[5]
[h]Health Care Protocols of SES/DF - Antidepressants for the Elderly[14]
Source: Martins AN, et al., 2025.

Figure 1 shows the coverage of the prescribed medications for both neurological and secondary conditions, in the EMLs.

Figure 1 - Presence of the prescribed medications in the essential medicines lists (n=122).



Note: WHO, the World Health Organization; RENAME, the National List of Essential Medicines; REME-DF, the Federal District Essential Medicines List. **Source:** Martins AN, et al., 2025.

DISCUSSION

The findings revealed that of the 122 medications prescribed at hospital discharge, 93 were included in the REME/DF (**Figure 1**), reflecting a significant effort by the SES-DF through the Central Pharmacy and Therapeutics Committee (CCFT) to ensure a comprehensive EML. This demonstrates the commitment of the DF to providing a broad EML for the population and promoting treatment continuity.

However, 27 medications were not included in any of the lists (WHO, RENAME, or REME/DF), which may have compromised the treatment of some patients (**see Supplementary Material – Table 1**). A study conducted by Magarinos-Torres R, et al. (2014), highlighted SUS physicians' low adherence to EMLs, leading patients to acquire medications at their own expense, thereby increasing their economic vulnerability. Although EMLs are familiar to physicians, they are often viewed as bureaucratic barriers with limited practical value for evidence-based prescriptions.

Although some medications prescribed in this study were not included in the EMLs, others such as duloxetine, macrogol + sodium bicarbonate + chloride, pregabalin, tizanidine, trazodone, zolpidem, aripiprazole, and solifenacin are recommended by therapeutic guidelines (**Table 2**). Additionally, only 6.8% of the medications prescribed during hospitalization (59 of 867 discharge prescriptions) were new to the patients (**see Supplementary Material - Table 2**).

However, the SUS in the DF provides certain medications for neurological conditions that are not listed in the WHO and RENAME lists, such as oxybutynin, baclofen, bisacodyl, and cyclobenzaprine, with bisacodyl available only in hospital settings (**see Supplementary Material – Table 1**).

Some frequently used medications (**Tabela 2**) are not available to the population through the SUS. For example, donepezil, memantine, and amantadine, which are indicated for cognitive treatment after brain injury, are provided by the SUS in this district only for specific diseases, such as Alzheimer's and Parkinson's disease, making them inaccessible to patients undergoing neurological rehabilitation.

Similarly, fludrocortisone, recommended for dysautonomia treatment, is administered only for adrenal insufficiency and congenital adrenal hyperplasia, limiting access for other patients through the SUS. Other medications, such as citalopram, are available only to individuals over 60 years of age, as their inclusion in REME/DF is limited to depression treatment in older adults, preventing younger patients from accessing them.

In addition, nifedipine is available only in hospital settings. These gaps suggest the need to review the EML in the DF to better meet the needs of the population in rehabilitation.

Despite advances in access to essential medications in the DF, patients face significant challenges in ensuring treatment continuity, particularly because of the complexity of the medication dispensing process. The requirement for extensive documentation and additional clinical tests to access medium-complexity and Specialized Component Pharmaceutical Assistance medications complicates the process for patients with low literacy and cognitive impairment, making medication acquisition a logistical and bureaucratic challenge (ROVER MRM, et al., 2016).

Another obstacle faced by patients in rehabilitation is the variation in the location of medication access, which depends on the level of care defined by the REME-DF. Currently, every administrative region in the DF has pharmacies located in Basic Health Units that provide basic care. However, some prescribed medications are not available in all health regions; for example, baclofen is available only at a medium-complexity pharmacy. Specialized component medication pharmacies are located in three places in the DF. This situation reflects access difficulties due to geographic factors, considering patients' residential locations, especially for those with limited financial resources and the need to visit multiple health establishments to obtain the necessary medications (TOMASIELLO DB, et al., 2023). For those residing in rural or remote areas, this challenge is even greater, exacerbating social and economic vulnerability, as described by Fiorati RC e Elui VMC (2015), and Bertoldi AD, et al. (2021). Furthermore, the absence of pharmacists in some Basic Health Units exacerbates this situation as it prevents the dispensing of special control medications, requiring patients to seek other establishments, which, in turn, increases access and treatment difficulties.

An additional challenge arises for patients residing outside the DF, as identified in this study (19.2%). This challenge is related to the lack of uniformity in EMLs between states, as the DF list may not include the same medications as those in other locations. This discrepancy can cause confusion, compromise treatment continuity, and negatively impact healthcare (VIEIRA FS, 2010).

Another notable issue is polypharmacy, with an average of 8.59 ± 3.06 medications prescribed per patient, increasing the risk of adverse drug interactions – a growing concern in clinical practice, especially among patients with multiple comorbidities. According to the WHO, polypharmacy in patients undergoing neurological rehabilitation can lead to significant negative consequences (WORLD HEALTH ORGANIZATION, 2006).

Living with neurological conditions often entails coping with debilitating physical symptoms, such as fatigue and pain, in addition to cognitive and emotional deficits that compromise autonomy and quality of life (AUDULV Å, et al., 2021). These challenges are exacerbated by the need to manage multiple medications, increasing the risks of side effects and adverse interactions. In this context, careful medical supervision and a personalized approach to managing these patients' health conditions become essential.

The role of caregivers, usually family members, is crucial in this context. They take on complex tasks, including managing physical and psychological symptoms, providing social and financial support, and often participating in discussions about advance care planning. These long-term responsibilities not only alter caregivers' daily lives but also impose a significant emotional, physical, and financial burden (SCHULMAN-GREEN D, et al., 2021).

The patients' demographic data reinforced the influence of SDH on their ability to access medications (FIORATI RC e ELUI VMC, 2015). Approximately 33% of patients had incomplete elementary education, 30% had an income of up to one minimum wage, and 17% had no income. This situation reflects the economic and educational limitations that hinder the understanding of healthcare instructions and aggravate barriers to accessing prescribed treatments. Moreover, social vulnerability was evident, with 37% of patients classified as medium complexity and 26% as high complexity, highlighting challenges in managing health conditions. Social support networks were another factor, with 79% of patients having a strong support network and 13% having a weak one, compromising their ability to effectively access health services and medications. For 2% of patients with no support network, treatment access is even more difficult given the challenges in managing their health conditions.

The support provided by caregivers goes beyond physical demands, encompassing the management of multiple health aspects and the implementation of strategies aimed at improving patients' quality of life. However, the burden faced by these caregivers is a constant reality, highlighting the need for interventions that strengthen both formal and informal support networks, promoting more sustainable and effective care (RANSMAYR G, 2021).

Access to health services, including medications, for people with disabilities is influenced by various factors. The barriers faced by individuals requiring rehabilitation, especially in low- and middle-income countries, are well known. The main barriers include a communication gap between professionals and patients/caregivers, financial limitations, attitudinal/behavioral issues, scarce service provision, and organizational and transportation barriers (BERTOLDI AD, et al., 2021; CLEMENTE KAP, et al., 2022; DRAINONI M-L, et al., 2006; ROVER MRM, et al., 2016; SMITH WT, et al., 2011).

This study highlights the need to revisit medication access policies in the context of rehabilitation, with particular attention to vulnerability. In support of previous studies (BERTOLDI AD, et al., 2021; CLEMENTE KAP, et al., 2022; DRAINONI M-L, et al., 2006; ROVER MRM, et al., 2016; SMITH WT, et al., 2011), this study reinforces the importance of a comprehensive approach to policy decisions and the adaptation of health systems to overcome the barriers faced by people with disabilities.

Healthcare professionals, including pharmacists who work directly with patients in rehabilitation and those who recognize the importance of medications not included in the EMLs in their region, should collaborate to develop clinical protocols that incorporate the necessary medications for this population. This observation is consistent with the conclusions of Conradie T, et al. (2022), who also emphasized the critical role of such collaboration in enhancing access and optimizing clinical outcomes in rehabilitation settings.

Although this study is limited to only one hospital and a limited number of observations, all records of individuals admitted during the study period were used to increase internal validity. Future research should include multicenter studies to evaluate regional disparities in medication access and the effectiveness of essential medicine lists. Future studies should also investigate the impact of including new medicines recommended by the WHO Rehabilitation Intervention Package, which will contribute to strengthening public policies and better address the specific needs of this population.

CONCLUSION

In the context of neurological rehabilitation, the inclusion of most medications in the REME/DF reflects the commitment of the DF to the PNAF, which aims to ensure access to essential medications and promote equity within the SUS. However, this study highlights persistent challenges in medication access, particularly for people with disabilities, and underscores the need to reorganize health services and improve inclusion strategies to adequately address this population's needs. Additionally, it identified the importance of expanding essential medicine lists to include treatments focused on the rehabilitation of neurological conditions, such as stroke, TBI, and SCI.

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