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REVISTA IBERO-AMERICANA DE SAÚDE E ENVELHECIMENTO
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ASSESSMENT OF SPATIAL ACCESSIBILITY AT A HOSPITAL UNIT IN THE SOUTH OF BRAZIL AND ITS IMPLICATIONS IN OLDER PERSONS' HEALTH

AVALIAÇÃO DA ACESSIBILIDADE ESPACIAL EM UMA UNIDADE HOSPITALAR NO SUL DO BRASIL E IMPLICAÇÕES NA SAÚDE DO IDOSO

EVALUACIÓN DE LA ACCESIBILIDAD ESPACIAL EN UNA UNIDAD HOSPITALARIA EN EL SUR DE BRASIL E IMPLICACIONES PARA LA SALUD DE LOS ANCIANOS

Patrícia Queiroz Silva[1], Karin Viegas[2].

[1]Hospital Humaniza, Porto Alegre,
[2]Federal University of Health Sciences of Porto Alegre.

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ABSTRACT

Introduction: Overcoming architectural barriers and enabling spatial accessibility at hospitals is a key aspect of care.

Objective: To analyze spatial accessibility for older persons with limited functional capacity at a tertiary hospital in Porto Alegre.

Method: A transversal study, composed of two participant groups. The data were collected via a structured questionnaire to identify the workers' and patients' difficulties in the daily life of a hospital regarding spatial accessibility. The physical environment assessment took place via direct observation and using a checklist as per ABNT/NBR 9050. The notion that the perception of environmental barriers is modified according to the older people's functional level was verified via the Katz Activities of Daily Living (ADL) scale. To assess the older people's perceptions of risks of falling, the FRAQ-BR questionnaire was applied along with the analysis of clinical-functional data collected from the participants' medical records.

Results: 37 older people participated in this study. The highest dependency levels in their daily living functions were found in females, as well as the prevalence of falling. The correlation of the fall with the functionality and the architectural barrier did not present significance.

Conclusion: Some flaws were found in the hospital physical structure. The space must be transformed to seek accessibility. Nevertheless, adherence to the regulatory norm is not enough to reach accessibility.

Keywords: Architectural Accessibility; Health of the Elderly; Mobility Limitation; Nursing Care.

RESUMO

Introdução: Diminuir as barreiras arquitetônicas e possibilitar a acessibilidade espacial no hospital, é uma dimensão importante do cuidado.

Objetivo: Analisar a acessibilidade espacial para idosos com capacidade funcional reduzida em um hospital terciário de Porto Alegre.

Método: Estudo transversal, composto por dois grupos de participantes. Os dados foram coletados através da aplicação de um questionário estruturado para identificar as dificuldades dos profissionais e dos pacientes no cotidiano hospitalar em relação à acessibilidade espacial. A avaliação do ambiente físico se deu através da observação direta, utilizando-se um *checklist* conforme ABNT/NBR 9050. A análise de que a percepção de barreiras ambientais se modifica de acordo com o nível funcional dos idosos foi verificada através da Escala de

Katz, para a avaliação da percepção dos idosos quanto aos riscos de queda foi aplicado o questionário FRAQ-BR, além da análise de dados clínico-funcionais coletados do prontuário dos participantes.

Resultados: Participaram da pesquisa 37 idosos. Os maiores níveis de dependência nas funções de vida diária se destacam entre o sexo feminino, bem como a prevalência de quedas. A correlação da queda com a funcionalidade e a barreira arquitetônica não se apresentou significativa.

Conclusão: Identificaram-se falhas na estrutura física hospitalar. Há necessidade de transformar o espaço em busca da acessibilidade. Apesar disso, a adesão a norma regulamentadora não é suficiente para se alcançar acessibilidade.

Palavras-chave: Acessibilidade Arquitetônica; Assistência de Enfermagem; Limitação da Mobilidade; Saúde do Idoso.

RESUMEN

Introducción: Disminuir las barreras arquitectónicas y posibilitar la accesibilidad espacial en el hospital es una dimensión importante del cuidado.

Objetivo: Analizar la accesibilidad espacial de ancianos con capacidad funcional reducida en un hospital de tercer nivel en Porto Alegre.

Método: Estudio transversal, formado por dos grupos de participantes. Los datos fueron recolectados a través de la aplicación de un cuestionario estructurado para identificar las dificultades de los profesionales y pacientes en el cotidiano hospitalario en relación a la accesibilidad espacial. El ambiente físico fue evaluado a través de la observación directa, utilizando una lista de verificación de acuerdo con la ABNT/NBR 9050. El análisis de que la percepción de las barreras ambientales cambia de acuerdo con el nivel funcional de los ancianos se verificó utilizando la Escala de Katz, para evaluar la percepción de la ancianos sobre el riesgo de caídas, se aplicó el cuestionario FRAQ-BR, además del análisis de los datos clínicos y funcionales recogidos de las historias clínicas de los participantes.

Resultados: 37 ancianos participaron de la investigación. Destacan los mayores niveles de dependencia en funciones de la vida diaria en el sexo femenino, así como la prevalencia de caídas. La correlación de la caída con la funcionalidad y la barrera arquitectónica no fue significativa.

Conclusión: Se identificaron fallas en la estructura física del hospital. Existe la necesidad de transformar el espacio en busca de la accesibilidad. Apesar de ello, el cumplimiento de las normas reglamentarias no es suficiente para lograr la accesibilidad.

Descriptores: Accesibilidad Arquitectónica; Atención de Enfermería; Salud del Anciano, Limitación de la Movilidad.

INTRODUCTION

With the increase in the older people population, overcoming architectural barriers and spatial accessibility is a key aspect of care[1,2]. This is one of the most relevant challenges for true citizenship to take place. Sidewalk adaptations, city signaling, tree planting must be considered in order to make both public spaces and health establishments[3].

The older people's physical condition deteriorates over time. This makes physical space adaptation necessary in order to avoid accidents and promote their independence, promoting their safety and motivation to carry out their daily life tasks. However, physical spaces may be either facilitators or inhibitors regarding participation and activity performance[4] and quality of life deterioration[5].

One of the guidelines of the National Health Policy for Older People – NHPOP (*Política Nacional de Saúde da Pessoa Idosa* – PNSPI) is the promotion of healthy aging, in which adequate conditions of access to public spaces for older people and the disabled must be guaranteed. Thus, a basic right of any citizen, to move freely, shall be guaranteed[6]. In addition, accessibility is a demand from an international agenda established by the United Nations (UN), as set out in Goal 11.7 of the UN Millennium Development Goals. It establishes that by 2030, universal access to safe, inclusive and accessible public spaces will have been provided, especially for older people and people with disabilities[7].

Regarding this issue, the Brazilian Standard (NBR) 9050 establishes criteria and technical parameters to be observed concerning the design, construction, installation and adaptation of buildings, furniture, spaces and urban equipment to the conditions of accessibility[8].

Since hospitals are areas recovery and restoration of health, they should comply with these standards, promoting an adequate environment to welcome this population and providing fall prevention in the hospital environment as a safety goal. This study aims to analyze spatial accessibility for older persons with limited functional capacity at a tertiary hospital in Porto Alegre.

METHOD

This is a cross-sectional study conducted at an admission unit that serves clinical and surgical patients of a large hospital in the metropolitan region of Porto Alegre. This hospital serves as a reference center for the local population and other cities of the state.

The sample was randomized and due to convenience, it was constituted by 37 older people admitted to two units of clinical and surgical admission units in the period May-June 2021. The inclusion criteria were age 60 years or older, both sexes, and participants who walk with or without auxiliary gait devices. Individuals with difficulty in communicating verbally and unable to understand and respond to simple verbal commands were excluded from this study.

The spaces (corridors, bedrooms and bathrooms) were evaluated through direct observation of the structures. When necessary, measurement was carried out using a measuring instrument (tapeline) as per ABNT/NBR 9050 guidelines[8].

To this end, a checklist form was previously devised according to norm ABNT/NBR 90508 in order to assist in data observation and annotation. This would provide greater fidelity for the evaluated items.

The notion that the perception of environmental barriers changes according to the functional level of older people was verified through basic activities of daily living (ABVD)[9], as evaluated by the Katz scale[10]. It includes self-care actions (bathing, personal hygiene, dressing, feeding, transfer and continence) and classifies older people as either independent or dependent. The score ranges from 0 (zero) to 6 (six) points, where 0 (zero) indicates total independence for the performance of the activities, and 6 (six) indicates dependence (total or partial) during all the proposed activities. The intermediate score indicates the total or partial dependence in an activity and it should be evaluated individually[6].

In addition, the FRAQ-BR[11] questionnaire was applied. It is an instrument designed for evaluating the perception of older persons regarding the risks of falling, in the form of an interview. Clinical-functional data were also analyzed. They were collected from patient medical records, such as: previous pathologies; drugs in use; dizziness complaint; musculoskeletal pain; visual acuity; functional capacity; and data on falls in the last year.

The data were stored in an Excel spreadsheet that was made for this study, and then they were analyzed using the Statistical Package for Social Science (SPSS) software, version 25.0, for tabulation and data analysis. The variables were described by descriptive statistics according to frequency, means, medians and standard deviation. They were presented in the form of tables and/or graphs, as appropriate.

To evaluate associations, the Pearson's Chi-square statistical test was applied for categorical variables, and Student's T-test was applied for quantitative variables.

The correlation of falling with patient functionality and architectural barriers was calculated by the Spearman's correlation coefficient. A coefficient of 0.70 for more or less indicates a strong correlation; a coefficient between 0.30 and 0.70, positive or negative, indicates a moderate correlation; a coefficient between 0 and 0.30 indicates a weak correlation.

This project is part of the project entitled "Development of Technologies for qualification of care processes for global attention to older people at a tertiary unit of the Unified Health System and followed all methodological procedures of Resolution No. 466[12]. This study was submitted to the Research Ethics Committees of the institutions involved and approved under CAAE 40993020.0.0000.5345 and 40993020.0.3001.5335.

RESULTS

It was necessary to record the entire pathway traveled from the parking lot to the evaluated hospitalization unit in order to assess accessibility. At the time of registration and evaluation of the physical structure, the institution was undergoing several renovations, and new spaces and access ways were being built. Some important changes in accessibility were found, such as the inclusion of an elevator with restricted access for patients in an area where there were only stairs and no space for building ramps.

The ramps associated with the stairs have the recommended minimum width, non-slip floor, and an adequate slope so that climbing does not require great effort. However, there is no presence of curb ramp guidelines throughout the length of the ramp and the projection of the railings. Another relevant issue is that the floor and the ramp are painted with very similar colors. This may cause viewing difficulties dusk despite the on-site lighting.

The stairs at the external and internal areas are associated with the ramp or a vertical transport equipment. The dimensions of the steps comply with the standards, as they do not have hollow mirrors; the floor is non-slip and the edge projections are within the recommended one. On the external stairs there is signaling of steps with a range at least 3 cm wide, contrasting with the adjacent floor; in the internal area of the hospital, the stairs do not present this signaling. The handrail is 0.92 m from the floor, it is of rigid material, it has a curved finish, is firmly fixed to the wall, and it has a circular section, which allows good grip and sliding. It is installed on both sides of the steps in the external area of the hospital; however, this norm not observed in its internal area.

Access to the admission unit is through the stairs or elevators that exceed the recommended minimum dimensions; it presents a protection at the door stop. The button is 1.30 m away from the ground, a value considered standard. In the internal area of the hospital there is a handrail on each side; in the posterior part of the elevator there are components as required by the norm.

The evaluation of the doors of the rooms indicated that they have a 1-m wide, 2.10-m high span. These dimensions are suitable because they allow the free passage of stretchers, wheelchairs etc. The handles are lever type and are installed at a height of 1.10 m. The stop is contrasting with the wall and the floor to facilitate its location. Both bedroom and bathroom doors do not have a horizontal handle associated with door handles that are installed at an appropriate height. In addition, there is no impact-resistant coating in the bottom part of the doors. The width sizing of 0.71 m, does not match the recommended minimum value of 0.8 m. In contrast, the 2.10-m height is in accordance with the standard size.

In the evaluation of the maneuver area for the bathrooms, none of them met the recommended measures. However, the measures provided for an area for wheelchair users to be transposed, measuring 0.80 m x 1.20 m, are met. The bathroom floor is non-slip. There are no gaps near the entrance or doorway; however, this obstacle was found in the box division. The floor and wall covering is contrasting.

The basins and sanitary seats have no elevation (42 to 45 cm from the floor) or proper elevation accent. The sink taps are not mono-command. This is a relevant issue because mono--commando taps are helpful for wheelchair users. The toilets are of a conventional model, according to recommendations. The discharge valves are at a correct height, and moderate force must be printed for its actuation. There are no support bars and transfer aid on the back of the toilet. Instead, there is only one 0.7-m x 0.6-m bar on the side. Access to toilet paper is free and easy; it does not hinder access to the bar.

The shower box dimensions were evaluated: 1.28 m x 0.8 m. The box making material is not impact resistant and has no minimum free width of 0.90 m. The use of fabric mat was found. It did not present an non-slip surface in some of the bathrooms.

Regarding the evaluation of the older people who were hospitalized, from the universe of 40 participants, 37 of them agreed to participate in the research. Of the total sample, 55.3% are female. The mean age was 72.6 years (61-90 years), and the median age was 72 years.

In the evaluation of functional status and ABVD, a Katz index classification was obtained. There was a predominance of older individuals classified as independent for all activities (Table 1↗). In the female sample, 25% are independent, and in males this index is 29.4%.

In the evaluation of the degree of dependence by function (Figure 1[7]), it was found that bathing is the function of greatest dependence among older persons (35.1% of them, n= 13), followed by the "getting dressed" function, with 27.03 % (n= 10). The highest levels of dependence in daily living functions were found among females.

It was found that 78.4% (n= 29) of the older persons are able to control their urinary and intestinal eliminations; the same group of individuals is able to control their eating, a task that they can perform completely independently.

As for the health of the interviewees, it is revealed that arterial hypertension was the most frequent pathology (70.3% of them, n= 26), followed by 40.5% (n= 15) and diabetes mellitus 18.9% (n= 7). Only 5.4% (n= 2) individuals reported no previous diseases. On the other hand, it was found that 62.2% (n= 23) of the participants claimed to have more than one associated disease.

Of the total sample, only 10.8% (n= 4) of the older individuals use four or more medications. At least 89.2% of them (n= 33) uses at least one medication. The most frequent use of antihypertensive medication class was the most prevalent (78.4% of them, n= 29), followed by hypoglycemic agents (21.6% of them, n= 8), diuretics (16.2% of them, n= 6), and antidepressants (16.2% of them, n= 6).

The most frequent complaints among the older persons were musculoskeletal pain (43.2% of them, n= 16) and walking difficulty (35.1% of them, n= 13). Dizziness was also mentioned (27.02% of them, n= 10), weakness (2.7% of them, n= 1), and paresthesia in the lower limbs (2.7% of them, n= 1). Of the 32.4% (n= 12) of older persons who stated that they did physical activity, 83.35 of them (n= 10) mentioned mild walks. This was followed by labor activity in the field (2.6% of them, n= 1) and weight training (2.6% of them, n= 1). Most of them denied doing exercises (67.6% of them, n= 25).

The use of glasses/lens is common among older persons (78.4% of them, n= 29). Nearly 39.5% of them reported having poor visual acuity; 32.4% of them (n= 12) reported regular visual acuity, and 27% of them (n= 10) reported good visual acuity.

Regarding the percentage of falls in the last year, 32.4% (n= 12) of the older persons reported at least one falling episode. Moreover, 50% of the older persons (n= 6) reported having suffered abrasion and bruise as a consequence of these falls, while 16.7% of them (n= 2) suffered cuts and only one individual needed hospital admission to perform prosthetic surgery on the knee. Of the 12 older people who suffered falls, nine were women.

In relation to the participants' perception of their risk of falling, they were asked about the main causes of falls. Of the total sample, 23 older persons answered this item. The most cited causes were weakness (30.4% of the participants, n= 7), followed by a poorly lit environment (21.73% of the participants, n= 5), dizziness (17.4% of the participants, n= 4), imbalance (13% of the participants, n= 13), and a wet floor (13% of the participants, n= 3). There was only one mention of uneven floor, inattention, lack of reflection and the act of climbing on benches or stairs to reach some object as possible causes of falling. About the risk of impending falls, 46.9% of the participants (n= 15) believe that they are at risk of falling at any time. In addition, 76.1% of them (n= 16) said that they had never received information about falls among older persons.

The percentage of correct answers in the FRAQ-BR interview ranged from 21.8% to 65.6%. There were 33 valid interviews; 4 interviews were deemed sample loss due to their not answering all questions, or the participants' refusal to answer essential questions of the instrument. None of the interviewees answered all questions correctly. However, two questions did not have any correct answers – question 3, about what the result of most falls was. Most of the participants answered, "No effect." 63.6% of them (n= 21) answered "cuts and bruises" as the most common result of falling. Moreover, the correct answer to question 22, about who has the highest chance of falling, was "women aged 65 years or older." 39.4% of the participants (n= 13) answered that the chance of falling is the same for both males and females.

The correlation between falling with patient functionality and the architectural barrier was not significant.

DISCUSSION

Inadequacies in the physical structure of the hospital environment partially meet the requirements established by ABNT 9050[8]. The hospital is still undergoing several internal and external reforms to meet the legal accessibility aspects.

The access to the hospital's internal dependencies observes the recommended minimum width, an non-slip floor, and adequate slope so that it does not demand excessive effort to climb it, thus helping patient displacement However, the distance/time to be traveled to the premises did not consider their ideal location[13-15], especially patients who need locomotion devices. This tends to be aggravated with aging. A study conducted in Poland[16] with 214 older persons, revealed that wheelchair use is more common in the age group of 55-60 years

compared to other ages, and the use of crutches tends to increase from 75 years on. The fact that younger older adults use more wheelchairs than the 85-year-olds is explained by the use by disabled people who have become disabled in previous years[16]. And as age progresses, the problem of barriers intensifies.

Another important point is that the floor and the ramp are the same color. This may can cause viewing difficulties at dusk despite the lighting at that area. Also, this may have a greater impact on people with reduced acuity such as the older persons who suffer from decreased sensitivity of the senses, that could lead to loss of color sharpness[17]. In a study by Hełdak *et al* (2018)[18], the interviewees did not report significant differences depending on their age. Nevertheless, this study results showed that a significant number of people need structural adjustments such as additional grids along the walls, ramps, sidewalks, handrails, and lifting equipment in the environment.

No signaling was found in most of the areas recorded photographically. The implementation of the International Symbol of Access (ISA), which corresponds to a white pictogram on a blue background and serves to indicate space adequacy. It must be exposed to be visualized in various conditions[19]. On the other hand, another study concluded that the ISA is not effective in representing individuals with mobility disabilities. Its ambiguous nature leads to confusion for people with and without disabilities[20].

Regarding the bathrooms, it was found that the toilets have no elevation (42 to 45 cm from the floor) or raised seats. This is a relevant issue because it is advantageous for wheelchair users. The toilet models are conventional, according to recommendations. Front opening toilets are prohibited, as they cause greater discomfort to the unpleasant fact that urine flows out of the vessel. This may cause odors and lack of hygiene. Furthermore, they are more dangerous, as the legs can fall into the opening and cause accidents[21].

These problems, identified in the bathrooms of the institution, are repeated in other studies[22,23]. Thus, exercising autonomy, independence and the safe use of sanitary facilities is impaired and does not favor people's basic right of locomotion. Greater attention to hospital bathroom ergonomics may ensure usability and accessibility[22].

According to the study population, the highest levels of dependence on daily living functions stand out among females. This corroborates the notion that mobility limitations in older persons are not equally distributed, as well as the number of children with disabilities in the aged people, with women showing greater limitations and a greater risk of mobility impairment compared to men[24,25]. In general, mobility limitations due to temporal or spatial changes of gait are verified, which is already a predictor of falls and mortality[26,27].

It was found that 78.4% of the older persons (n= 29) are able to control basic functions such as their urinary and intestinal eliminations; this group of individuals is also able to control their eating, a task that they can perform completely independently. This analysis reaffirms the theory in which functional losses progress from the most complex to the most basic functions, while the more basic and less complex function are preserved for a longer period of time[28].

Concerning participant health, it was found that arterial hypertension was the most frequent pathology (70.3% of them, n= 26), followed by diabetes mellitus. This sum of comorbidities endorses polypharmacy in this group of individuals. This is a prevalent condition in older persons and it has been widely associated with adverse results, including disability, hospitalizations, and death[29,30]. Drug consumption tends to grow among the older persons population in the coming years due to increased life expectancy and increased chronic diseases to the detriment of acute diseases[31].

Of the 12 older people who suffered falls, 9 of them were women, as per data found in other studies[32]. Despite these evidences, no relation was found between falls of the height itself and the use of medication, as well as the correlation of the fall with the functionality of the patient and the architectural barrier were not significant.

About the perception of the risk of fall, when asked about the main causes of fall in the older persons population, the most cited cause was weakness, an intrinsic factor; this was followed by a poorly-lit environment. Such a result is different from what was found by Teixeira *et al* (2019)[32], in which 80.0% of the older persons interviewed fell due to factors associated with the environment in which they lived, while 20% fell due to adverse reactions such as dizziness symptoms and/or related to biological and psychosocial disorders, characterized as intrinsic factors.

In addition, 76.1% of them said they had never received information about falls. This strengthens the urgency how urgent it is to implement fall prevention routines in hospital environments. This must start with patient education, by transmitting daily care routines to avoid accidents.

CONCLUSION

This analysis of structural and architectural characteristics carried out in the hospitalization units found some issues. It was concluded that the enforceable accessibility norms are not being respected in their entirety.

One limitation of this study is that the sample number of older individuals was not sufficient to measure relevant differences in the perception of environmental barriers according to the functional level of older persons.

The results propose opportunities to develop and evaluate interventions regarding the search for accessibility of older and disabled persons. Although the investigated institution invests in reforms, many environments still lack adjustments. This is because extrinsic risk factors are easier to change compared to intrinsic factors. Nonetheless, the older persons' health must be monitored to avoid functional decline and loss of quality of life.

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Authors
Patrícia Queiroz Silva
https://orcid.org/0000-0002-2632-4340
Karin Viegas
https://orcid.org/0000-0002-2546-9281

Corresponding Author/Autor Correspondente:
Karin Viegas – Universidade Federal de Ciências da Saúde de Porto Alegre, Porto Alegre, Brasil.
karinv@ufcspa.edu.br

Authors' contributions/Contributos dos autores
PS: Coordenação do estudo, desenho do estudo, recolha, armazenamento e análise de dados, revisão e discussão dos resultados.
KV: Desenho do estudo, análise de dados, revisão e discussão dos resultados.
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Table 1 – Distribution of sex and the Katz Index in older persons. Porto Alegre, Brazil. 2021.

Katz Index	Female		Male		Total	
	n	%	n	%	n	%
A – Independent for all activities	5	25	5	29,4	10	27,1
B – Independent for all activities except one	0	0	2	11,8	2	5,4
C – Independent for all activities except for bathing and one more	3	15	2	11,8	5	13,5
D – Independent for all activities except for bathing, getting dressed, and one more	1	5	0	0	1	2,7
E – Independent for all activities except for bathing, getting dressed, going to the bathroom, and one additional activity	4	20	2	11,8	6	16,2
F – Independent for all activities except for bathing, getting dressed, going to the bathroom, and one additional activity	2	10	2	11,8	4	10,8
G – Dependent for all activities	3	15	0	0	3	8,1
Dependent on at least two functions, but are not classified as C, D, E and F	2	10	4	23,5	6	16,2
Total	20	100	17	100	37	100

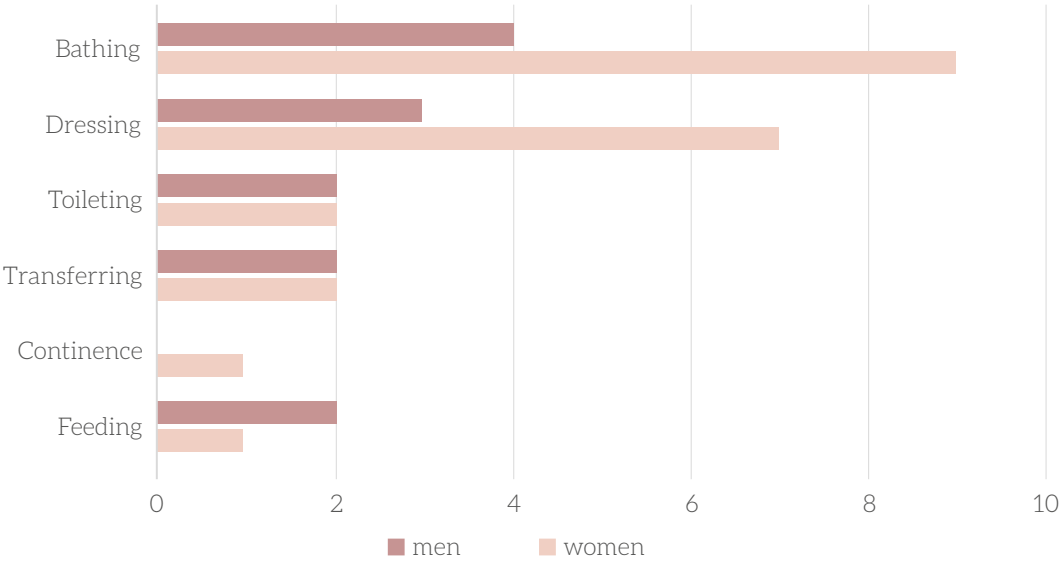

Figure 1 – Evaluation of the degree of dependence according to function and sex. Porto Alegre, Brazil, 2021.