REVISTA PORTUGUESA DE
ENFERMAGEM DE
REABILITAÇÃO

VOL. 6, Nº 2

Original article reporting clinical or basic research
DOI - 10.33194/rper.2023.365 | Electronic identifier – e365
Submission date: 02-09-2023; Acceptance date: 04-11-2023; Publication date: 05-11-2023

CAPACITAÇÃO DO CUIDADOR INFORMAL PARA A ABORDAGEM DO EQUILÍBRIO CORPORAL DA PESSOA DEPENDENTE EM CONTEXTO DOMICILIÁRIO

INFORMAL CAREGIVER TRAINING IN APPROACHING THE BODY BALANCE OF LONG-TERM CARE USERS AT HOME

FORMACIÓN DEL CUIDADOR INFORMAL PARA ABORDAR EL EQUILIBRIO CORPORAL DE LA PERSONA DEPENDIENTE EN CONTEXTO DOMICILIARIO

David Pinto[1]; Sérgio Magalhães[2]; Salomé Ferreira[3]

[1] *Centro Hospitalar Universitário de São João, Porto, Portugal*

[2] *AceS Grande Porto III Maia/Valongo – UCC Ermesinde, Ermesinde, Portugal*

[3] *Instituto Politécnico de Viana do Castelo, Viana do Castelo,, Portugal*

Corresponding author: David Pinto, ez.pinto@gmail.com

How to cite: Mesquita Pinto ED, Nascimento Magalhães SP, Martins Ferreira MS. Capacitação do cuidador informal para a abordagem do equilíbrio corporal da pessoa dependente em contexto domiciliário . Rev Port Enf Reab [Internet]. 5 de Novembro de 2023 [citado 5 de Novembro de 2023];6(2):e365. Available in: https://rper.aper.pt/index.php/rper/article/view/365

FICHA TÉCNICA

eISSN: 2184-3023 pISSN: 2184-965X

www.rper.pt

PROPRIEDADE INTELECTUAL

Associação Portuguesa dos Enfermeiros de Reabilitação

www.aper.pt

A equipa editorial da revista pode ser consultada em https://rper.aper.pt/index.php/rper/about/editorialTeam
A equipa de revisores da revista pode ser consultada em https://rper.aper.pt/index.php/rper/revisores

RESUMO

Introdução: As pessoas dependentes sofrem um declínio de algumas capacidades físicas e cognitivas como a perda de força muscular e mobilidade articular, diminuição da coordenação sensória-motora e, consequentemente, comprometimento do equilíbrio estático e dinâmico. Isto, aliado a uma vontade da sociedade cuidar destas pessoas em ambiente domiciliário o mais tempo possível, dá uma enorme relevância à figura do cuidador informal e às suas necessidades educativas.

Objetivo: Avaliar o contributo de um programa de capacitação, aplicado por Especialistas em Enfermagem de Reabilitação, a cuidadores informais para a abordagem do equilíbrio corporal na pessoa dependente em contexto domiciliário.

Metodologia: Estudo quase experimental de grupo único, longitudinal com observação antes e depois do programa de capacitação, em contexto de visita domiciliária, com a aplicação de um programa dividido em 6 sessões. Trata-se de uma amostra de cariz não probabilística e por conveniência, com 10 cuidadores informais e respetiva pessoa dependente, alvo de cuidados. Para a recolha de dados foi utilizado um formulário sociodemográfico, pesquisa no processo clínico informatizado do paciente, grelha de observação elaborada para o efeito, escala do Teste de Tinetti e o Índice de Barthel.

Resultados: Foi possível verificar que após intervenção, os cuidadores informais melhoraram os conhecimentos relacionados com a abordagem do equilíbrio da pessoa dependente e que os pacientes alvo de cuidados apresentaram ganhos médios significativos no equilíbrio e autonomia.

Conclusão: As pessoas no domicílio, com um grau elevado de dependência, podem usufruir de cuidados básicos ligados ao equilíbrio estático sentado, através da capacitação do respetivo cuidador informal, refletindo-se em ganhos no equilíbrio e autonomia.

Descritores: Enfermagem de Reabilitação; Equilíbrio postural; Cuidador informal, Capacitação, Idoso.

ABSTRACT

Introduction: The increasing elderly fringe of the Portuguese population suffers a decline in some physical and cognitive abilities like loss of muscle strength and sensory-motor coordination and consequently impairment of static and dynamic balance. This combined with the desire on the part of society to take care of these people in a home environment for as long as possible, gives enormous relevance to the figure of the informal caregiver and their educational needs.

Objective: To evaluate the contribution of a training program applied by rehabilitation nurse specialists on informal caregivers in the approach to body balance of the long-term care users at home.

Methodology: Quasi-experimental study, single group, with observation before and after a training program, in the context of home visits, divided into 6 sessions. The sample was non-probabilistic and by convenience. It included 10 informal caregivers and their dependent person being cared for. For data collection was used a sociodemographic form, research in

the computerized clinical file of the user, an observation grid was prepared for the purpose, the Tinetti Test and the Barthel Index.

Results: We found that after the intervention the informal caregivers demonstrated mastery of the theoretical and practical knowledge transmitted, and the dependent long-term care users showed significant average gains in balance and autonomy.

Conclusion: People in the household with a high degree of dependence can benefit from basic care related to static sitting balance through the training of the respective informal caregiver, which is reflected in gains in their balance and autonomy.

Descriptors: Rehabilitation Nursing; Postural balance; Informal caregiver, Training, Elderly.

RESUMEN

Introducción: La creciente franja de edad avanzada de la población portuguesa sufre una disminución de algunas capacidades físicas y cognitivas como pérdida de fuerza muscular, disminución de la coordinación sensoriomotora y, en consecuencia, deterioro del equilibrio estático y dinámico. Esto, unido al deseo de la sociedad de cuidar a estas personas en casa el mayor tiempo posible, otorga una enorme importancia a la figura del cuidador informal y sus necesidades educativas.

Objetivo: Evaluar la contribución de un programa de capacitación aplicado por Especialistas en Enfermería de Rehabilitación a cuidadores informales en el abordaje del equilibrio corporal en la persona dependiente en el contexto domiciliario.

Metodología: Estudio cuasi-experimental de un solo grupo con observación antes y después de un programa de entrenamiento, en el contexto de visitas domiciliarias, dividido en 6 sesiones. La muestra fue no probabilística y por conveniencia. Incluyó 10 cuidadores informales y la respectiva persona dependiente cuidada. Los instrumentos de recolección de datos fueron ficha sociodemográfica, historia clínica informatizada del usuario, grilla observación preparada para al efeto, Test de Tinetti e Índice de Barthel.

Resultados: Se pudo comprobar que después de la intervención los cuidadores informales demostraron dominio de los conocimientos teóricos y prácticos transmitidos, y las personas dependentes mostraron ganancias medias significativas en equilibrio y autonomía.

Conclusión: Las personas con alto grado de dependencia pueden beneficiarse de los cuidados básicos relacionados con el equilibrio estático sentado en casa a través de la capacitación del respectivo cuidador informal, lo que se refleja en ganancias en su equilibrio y autonomía.

Descriptores: Enfermería de Rehabilitación; Equilibrio postural; Cuidadores informales, Capacitación, Anciano.

INTRODUCTION

Currently, with the increasing average life expectancy at 65 years-old, and a significant percentage of this segment of the older population with dependency situations (32.1% in 2020), combined with society's desire to care for these people in a home environment as long as possible, there's relevance to the informal family caregiver and their educational needs [1] [2].

Informal caregivers, according to the new Informal Caregiver Statute, regulated by Law nº 100/2019, on September 6, 2019, chapter I, article 2, can be considered main or non-main. In general, the informal Caregiver is defined as a spouse, relative or similar up to the 4th degree of the straight line or collateral line of the person being cared for, who is responsible for organizing assistance and providing care to the dependent person, which may be permanent, living in shared housing and does not receive any remuneration, or on a regular basis, but not permanently, and may or may not receive remuneration for professional activity or for the care provided to the person being cared for [3].

With regard to the needs of informal caregivers, in a study carried out with family caregivers of patients from the Integrated Continuous Care Team (ICCT) in the Coimbra area, it was found that most of them had the capacity to acquire new information and provide simple or close-to-normal care in their daily lives such as eating or moving in a wheelchair, but they presented increasing limitations with regard to other self-care skills and deficits inherent in the organization of the functioning of the house, namely: ensuring the arrangement and preparation of meals (26.4%); ensuring the dependent family member is accompanied to health services (23.3%); ensuring current domestic purchases (21.7%); difficulty in ensuring food storage (14.6%). In addition to this global situation, the authors report that when they stratified these data by the age of the family caregiver, there was an obvious worsening of the situation with increasing age [4].

The progressive deterioration of sensory information (proprioceptive, visual and vestibular) is identified as a cause of postural instability in aging [5]. Likewise, studies indicate that the increase in body sway with age reflects the decline in body stability [5–7]. Maintaining a stable posture is of great importance for movement. Therefore, when the postural control system is affected, whether due to illness or age, for example, it can have harmful consequences such as an increased risk of falls for the elderly population, a fact that has been identified as a serious public health problem [8].

The situation of frailty is increasingly prevalent in older ages. Although there is no uniform international concept, there is a consensus that Frailty syndrome is the result of the consequences of the decline of multiple physiological systems, particularly the neuromuscular, neuroendocrine and immune systems, related to aging. Thus, this syndrome is characterized by elderly patients who generally present weight loss, fatigue, changes or slowing of gait, loss of strength and muscle mass (sarcopenia), and generally associated with a complexity of pathologies and reduced tolerance to therapeutic interventions [9].

Balance and postural control are closely linked to the concept of motor control and all selective movement that occurs during a functional activity, such as sitting, is interactive and interdependent with the postural control mechanism in order to maintain alignment and correct use. of the various muscle groups to maintain the balance necessary for function. To obtain good postural control it is necessary to develop more specifically postural orientation and stability. Postural orientation is understood as the ability to maintain an appropriate relationship between different body segments as well as between the body and the environment. Postural stability translates into the establishment of a balance between the forces of stability and instability. For example, when working with an individual to reacquire static or dynamic balance functions, these are related to whether or not they have postural control [10,11].

Postural control is a complex task derived from multiple sensorimotor processes. Understanding this complexity emerges from the synergy of the interaction of different physiological subsystems. This interaction allows the ability to maintain posture, walk and interact with the environment in a safe and effective way. Thus, the subsystems that constitute postural control are the sensory system (which includes the vestibular, visual and proprioceptive systems), the central nervous system and the musculoskeletal system [12].

One of the main functions of the Rehabilitation Nursing (RN) is to meet the educational needs of caregivers by teaching the person and/or caregiver specific self-care techniques and technologies, as well as training inherent to physical activity and exercise [13]. In the case of informal caregivers with dependent elderly people, these needs may be linked to the health education of caregivers in areas such as illnesses and possible exacerbations, drug therapy, diets and physical exercise [14].

In this sense, one of the RN's roles is to contribute to the acquisition of knowledge and skills by family caregivers, enabling them to provide care [15] and this can be achieved through a focus on instruction and training in basic skills, which also contributes to their motivation in responding to these challenges [16].

The RN, when considers the type of CNS injury, must identify which processes are affected and then develop effective motor and sensory strategies to satisfy the postural demands required to perform a given task, in a specific environment [8].

To counter this scenario of decline in physical and mental capabilities and greater risk of dependence associated with advanced age, a systematic review concluded that the use of interventions linked to exercise, especially those linked to strength and balance training, could have success in improving functional capabilities in a population of institutionalized elderly patients with a probably high Frailty rate [17]. Also Garcia et al[18] found that teaching, instruction and balance training in elderly people can have significant results in improving activities of daily living.

A 2012 systematic review that studied the effectiveness of exercise programs in elderly people with frailty in a home environment concluded that they are effective in improving functional capacity with moderate, but not severe, frailty. Although there are still doubts about the impact of home interventions, they are considered potentially simple, safe and generally applicable actions to prevent the decline of this portion of the population [19]. This is confirmed in a more recent systematic review from 2020, also emphasizing nutritional gains and incidence of falls [20]. For example, sitting balance training can be easily applied to elderly people with partial dependence in which the person does the exercise sitting, for example, on the edge of the bed, with their feet firmly supported on the floor or step. The RN monitors the person for safety, while the patient is challenged, for example, to follow instructions to raise their arms in several different directions. Subsequently, the ability to maintain balance and postural control is assessed [21].

Taking the above into account, we decided to develop a study that would allow us to evaluate the added value of a training program for informal caregivers in addressing body balance in dependent people in a home context.

MATERIALS AND METHODS

In order to answer the research question "can the rehabilitation nurse train the informal caregiver to approach the balance of the dependent person cared? We opted for a quasi-experimental single-group methodological design with observation before and after the intervention. In fact, these studies allow us to observe phenomena when the random distribution of subjects is hardly feasible, as in this case in a clinical context. These types of quasi-experimental designs do not have equivalent groups created by random assignment or do not have control groups [22]. However, individual observation before and after acts almost like each participant functioning as their own control group, improving internal validity [22]. The following aims were defined:

- To evaluate the added value of training informal caregivers in addressing the dependent person's body balance, in a home context.
- To understand whether training the informal caregiver to approach the dependent person's balance has an influence on the dependent person's autonomy in the home context.

To develop our study, we defined the following hypotheses:

Hypothesis 1 (H1) - Dependent patients at home experience gains in balance when their informal caregiver is trained to approach balance.

Hypothesis 2 (H2) – Dependent patients at home experience gains in autonomy when their informal caregiver is trained to approach balance.

To respond to the aims recommended in this study, two evaluation moments were carried out, at the beginning and at the end of the application of the informal caregiver training program on static sitting balance (experimental intervention) to each caregiver and respective patient targeted for care.

The sample for this study was non-probabilistic and for convenience, it was selected from among informal caregivers of dependent patients, from an ICCT in the north of the region from December 2021 to February 2022, who met the following inclusion criteria:

- To know how to read, write;
- To be over 18 years old;
- To be an informal caregiver for the dependent patient;
- The respective person receiving care must be a patient at ICC de Ermesinde; being over 65 years old and/or having total dependence (0 to 20 points on the Barthel Index), or severe dependence (21 to 60 points on the Barthel Index), or moderate dependence (61 to 90 points on the Barthel Index).

As exclusion criteria, we defined non-compliance with sitting static balance exercises, by the person receiving care with the support of an informal caregiver, in daily practice when getting up to the chair for 1 hour or even signs of intolerance.

After applying the selection criteria, we were left with a total sample consisting of 10 informal caregivers and their dependent patient, the target of care.

DATA COLLECTION INSTRUMENTS

In addition to the socio-demographic form to characterize the sample, the data collection instruments were observation grid of the binomial informal caregiver/patient receiving care; Barthel Index and Tinetti Test to assess autonomy and balance respectively in the patient receiving care, applied at both assessment moments.

Regarding the observation grid for the binomial informal caregiver/patient receiving care, it consists of 10 items, explained in Chart 1, applied by the RN and evaluated as present or not.

The observation grid was constructed by the researchers based on the literature on static sitting balance and postural balance, which constituted the theoretical basis of our training program. The supporting paper brochure used later also addresses the same items [8,17–19,21,23–26].

Chart 1 – Concepts covered in the training program and evaluated in the observation grid

CONCEPTS	OBSERVATION GRID
Benefits of sitting static balance	1. Do you know the advantages for static balance by implementing the routine of sitting in a rigid chair or equivalent for periods at a desk or equivalent?
Postural control	2. Do you keep your torso upright using a pillow if necessary (prevents flexion and rotation)?
	3. Do you maintain hip flexion at 90º?
	4. Do you maintain full support of your feet on a hard surface?
	5. Does it provide rigid support for the arms on a worktable or equivalent?
	6. Do you supervise positioning, avoiding or correcting trunk tilt, hip extension, and sliding of the upper limbs?
Dual task activities	7. Do these periods coincide with greater stimulation (e.g. visits, active recreational activities)?
Chair posture correction technique	8. Do you know the technique for correcting posture in a chair?
	9. Do you apply the posture correction technique in the chair?
Signs of physical intolerance.	10. Do you recognize signs of intolerance?

After selecting the sample, the training program began, divided into 6 sessions over a period of 6 weeks. The first phase of 5 sessions took place over the first 4 weeks, with one to two sessions per week, with the initial assessment being included in the first session. The last phase took place in the 6th week, in which the last session corresponding to the final assessment was carried out. The sessions were applied individually, in the context of home visits and during the 3-month data collection period. As there were new admissions with inclusion criteria, they were introduced into the program and added to the sample for this research study. Regarding the program, it was all developed by RN, being organized as shown in Chart 2.

Chart 2 – Informal caregiver training program

TRAINING PROGRAM FOR INFORMAL CAREGIVERS FOR SITTING STATIC BALANCE		
Contents	• Static balance sitting; Balance physiology: main mechanisms; Sitting static balance training; Postural control support material; Prevention of falls and musculoskeletal injuries.	
Methods	• Expository, demonstrative and active method: exposure of theoretical contents. • Demonstration of practical procedures and carrying out practical dynamics.	
Pedagogical resources	• Paper brochure with theoretical-practical support content. • Adaptation of support material already existing at home for postural control. • Observation grid of theoretical-practical aspects before and at the end of the program. • Balance and autonomy assessment scales applied at the beginning and end of the program.	
Duration and activities (30 minutes each session)	1st	• Introduction of the study and its objectives. Presentation of the Informed Consent document. • Application of the socio-demographic questionnaire to the informal caregiver. • Initial assessment through the application of the Observation Grid on theoretical-practical knowledge within the scope of sitting static balance. • Initial assessment through the application of the Barthel Index and the Tinetti Test to the patient receiving care.
	2nd	• Supply and presentation of paper brochures. • Development of theoretical-practical concepts. • Teaching the informal caregiver about sitting static balance exercises.
	3rd	• Instruction and training for the informal caregiver on sitting static balance exercises aimed at the dependent patient under their care. Instruction for daily practice when getting up from a chair for 1 hour or until signs of intolerance. • Adaptation of support material available at home.
	4th	• Reinforcement and praise for the informal caregiver on static balance exercises while sitting for the patient under their care. Encouragement for daily practice when getting up in a chair for 45 minutes or until signs of intolerance. • Adaptation of home support schedules or ICCT home visits when necessary to support the implementation of sitting static balance exercises.
	5th	• Informal caregiver supervision in the application of sitting static balance exercises.
	6th	• Final assessment through the application of the observation grid on theoretical-practical knowledge within the scope of sitting static balance. • Final assessment of the balance and degree of dependence of the patient receiving care through the application of the Barthel Index and the Tinetti Test to the patient receiving care.

The analysis of results was carried out through descriptive and inferential analysis using sample normality tests applying the Wilcoxon test, T Test and Spearman Coefficient, according to the presence or absence of normal distribution of the different variables in the sample, to analyze the hypotheses raised. Data processing was computerized using the SPSS version 28 (Statistical Package for the Social Sciences) program.

In accordance with the duty of secrecy enshrined in article 85 of Professional Nursing Deontology (27), the anonymity of participants in the study was ensured, and safeguarding the confidentiality of their data, being identified numerically as informal caregiver 1, informal caregiver 2 and so on and never by first name. Participation in this study was strictly voluntary after being made aware of it. Thus, with regard to respect for ethical guidelines for research, namely the principles of Veracity and Confidentiality and in accordance with article 84 - Duty to Inform - free and informed consent was requested (informing the informal

caregiver and target patient about the risks and benefits of care) [28]. This study was approved by the ARSN Ethics Committee with opinion number CE/2022/9.

RESULTS

The sample consists of 10 informal caregivers and their respective care targets (N=10). The ages of informal caregivers are between 51 and 85 years old and the average age is approximately 62 years old (mean: 61.90; standard deviation: 12.35). The ages of patients receiving care range from 54 to 97 and the average age is approximately 81 years old (mean 80.80; standard deviation: 11.41).

Regarding gender, the majority are female, both among caregivers and patients, representing 90% and 70% of the sample respectively.

Regarding the patients' clinical history, it appears that although the vast majority have diabetes and high blood pressure, they also suffer from a wide variety of other chronic pathologies. Therefore, it was decided to categorize the objective clinical history according to the affected body functions, based on the International Classification of Functioning, Disability and Health [29].

Thus, as shown in table 1, it is observed that according to the objective clinical history, the majority of cases (90%) present conditions related to bodily functions linked to blood pressure (arterial hypertension) and metabolic system (with diabetes being prevalent). in all cases where this change was targeted. Standing out with a frequency between 70% and 50% are conditions linked to functions of the cardiac system, mental functions, functions of blood vessels, functions of the hematological and immunological system, functions of the digestive, joint and bone functions and motor functions.

TABLE 1 – BODILY FUNCTIONS AFFECTED ACCORDING TO PATIENTS' CLINICAL HISTORY

	Frequency	Percentage (%)
Conditions related to blood pressure functions	9	90.0
Conditions related to functions of the metabolic and endocrine systems	9	90.0
Conditions related to cardiac system functions	7	70.0
Conditions related to mental functions	6	60.0
Conditions related to blood vessel functions	6	60.0
Conditions related to functions of the hematological and immune system	6	60.0
Conditions related to digestive system functions	6	60.0
Conditions related to the functions of joints and bones	6	60.0
Conditions related to functions linked to movement (voluntary or involuntary reflexes, gait pattern, neuromuscular and movement-related functions)	5	50.0

	Frequency	Percentage (%)
Conditions related to auditory and vestibular functions	3	30.0
Conditions related to vision and other related functions	2	20.0
Conditions related to urinary functions	2	20.0
Conditions related to respiratory system functions	1	10.0
Conditions related to genital and reproductive functions	1	10.0
Conditions related to muscular functions (strength, tone, resistance, others)	1	10.0
Conditions related to skin functions and related structures	1	10.0

As it can be seen in table 2, with regard to the level of education of informal caregivers, the most frequent qualification is the 1st cycle with 40% of cases, with 70% of cases having a qualification level between the 4th class and 9th class.

TABLE 2 – EDUCATIONAL QUALIFICATIONS OF THE INFORMAL CAREGIVER

	Frequency	Percentage (%)
1st Cycle (4th class)	4	40.0
2nd Cycle (6th class)	3	30.0
3rd Cycle (9th class)	1	10.0
High school	1	10.0
Bachelor's degree or higher	1	10.0
Total	10	100.0

Regarding the professional situation of the informal caregiver, there is also a variety of situations, although it should be noted that only 20% of these are workers active in the labor market, as it can be seen in table 3.

TABLE 3 – PROFESSIONAL STATUS OF THE INFORMAL CAREGIVER

	Frequency	Percentage (%)
Unemployed	1	10.0
Employee	1	10.0
Self-employed	1	10.0
Retired	2	20.0

	Frequency	Percentage (%)
Housekeeper	2	20.0
Caregiver hired by the family	3	30.0
Total	10	100.0

Also resulting from the economic situation of the household, it is also important to know how many of the patients receiving care benefited from home support in addition to ICCT and it was found that 60% of cases benefit from home support. As it can be seen in table 4, support services range from food, hygiene, clothing and comfort to support from a permanent carer and/or even a specialized health professional.

Table 4 – Type of home support

	Frequency	Percentage (%)
Housing hygiene / Care of the patient's personal clothing / Personal hygiene and comfort (includes positioning) / Provision and support with meals	1	10.0
Hired caregiver	1	10.0
Caregiver in foster care	1	10.0
Hired caregiver and physiotherapist	1	10.0
Housing hygiene / Care of the patient's personal clothing / Personal hygiene and comfort (includes positioning)	2	20.0
No support	4	40.0
Total	10	100.0

It was also considered important to assess the level of knowledge of informal caregivers through an observation grid constructed of 10 verifiable items associated with the knowledge transmitted in the program in question. Thus, it can be seen from the analysis of table 5 that before applying the training program the values are very low, that is, 90% of the sample does not complete any item, while after applying the program the values are very high, being that in 90% of the sample demonstrates knowledge of 10 to 8 items. This means that most of the theoretical-practical knowledge transmitted was successfully acquired by the caregivers.

Table 5 – Level of knowledge of the informal caregiver before and after the training program

Number of items checked	1st Session of the training program		6th Session of the training program	
	Frequency	Percentage (%)	Frequency	Percentage (%)
10 to 8 items	0	0.0	9	90.0

Number of items checked	1st Session of the training program		6th Session of the training program	
	Frequency	Percentage (%)	Frequency	Percentage (%)
7 to 5 items	0	0.0	0	0.0
2 to 4 items	1	10.0	0	0.0
1 item	0	0.0	1	10.0
0 items	9	90.0	0	0.0

To evaluate the added value of training the informal caregiver in approaching body balance in the dependent person in a home context, the Tinetti Test was applied, which from the analysis of table 6 shows that in the first moment it was 2.10 points (standard deviation of 3.510) and in the second moment the average is 11.00 points (standard deviation of 6.733).

TABLE 6 – REFLECTION OF INFORMAL CAREGIVER TRAINING IN BALANCE IN PATIENTS RECEIVING CARE (N=10)

TINETTI TEST	1st Session of the training program			6th Session training program		Statistical test for paired samples	
	N	Average	Standard deviation	Average	Standard deviation	Wilcoxon Signed Ranks Test	
1 – Sitting balance	10	0.20	0.422	1.70	0.675	✕	✕
2 - Getting up	10	0.30	0.483	0.70	0.675	✕	✕
3 - Immediate balance (first 5 seconds)	10	0.40	0.699	1.30	0.823	✕	✕
4 - Standing balance with feet parallel	10	0.10	0.316	0.60	0.516	✕	✕
5 - Small imbalances in the same position	10	0.30	0.483	1.30	0.823	✕	✕
6 – Closing the eyes in the same position	10	0.20	0.422	0.70	0.483	✕	✕
7 – 360º turn (2 times)	10	0.00	0.000	0.10	0.316	✕	✕
8 - Single-leg support (holds at least 5 seconds stably)	10	0.00	0.000	0.00	0.000	✕	✕
9 - Sitting down	10	0.30	0.483	1.10	0.738	✕	✕
10 - Start of the march	10	0.00	0.000	0.10	0.316	✕	✕
11 - Width of the right step	10	0.00	0.000	0.40	0.516	✕	✕
12 - Right step height	10	0.00	0.000	0.50	0.527	✕	✕

TINETTI TEST	1st Session of the training program			6th Session training program		Statistical test for paired samples	
	N	Average	Standard deviation	Average	Standard deviation	Wilcoxon Signed Ranks Test	
13 - Width of the left step	10	0.00	0.000	0.40	0.516	✕	✕
14 - Height of the left step	10	0.00	0.000	0.50	0.527	✕	✕
15 - Step symmetry	10	0.00	0.000	0.40	0.516	✕	✕
16 - Step continuity	10	0.00	0.000	0.10	0.316	✕	✕
17 - 3 meter path	10	0.10	0.316	0.50	0.527	✕	✕
18 - Trunk stability	10	0.20	0.422	0.50	0.527	✕	✕
19 - Support base during walking	10	0.00	0.000	0.10	0.316	✕	✕
Total score	10	**2.10**	3.510	**11.00**	6.733	Z= 2,670	p= 0,008

To understand whether the training of the informal Caregiver to approach the dependent person's balance has an influence on their autonomy in the home context, the Barthel Index was applied through direct observation at the initial moment (1st session) and final moment (6th session). Thus, through the analysis of table 7, we can observe that the average of this test in the first moment is 20.50 points (standard deviation of 21.915) and in the second moment the average is 41.50 points (standard deviation of 24.387).

TABLE 7 – REFLECTION OF INFORMAL CAREGIVER TRAINING ON THE AUTONOMY OF PATIENTS RECEIVING CARE

BARTHEL INDEX	1st Session of the training program			6th Session of the training program		Statistical test for paired samples	
	n	Average	Standard deviation	Average	Standard deviation	Wilcoxon Signed Ranks Test / Student's T Test	
1 - Personal hygiene	10	0.00	0.00	0.50	1.581	z = 1	0.317
2 - Evacuating	**10**	**4.00**	**4.595**	**6.50**	**4.116**	**z = 2.236**	**0.025**
3 - Urinating	10	3.50	4.116	5.00	4.714	z =1.732	0.083
4 - Going to the bathroom (use of toilet)	10	2.00	2.582	2.50	2.635	z =1.000	0.317
5 - Feed	**10**	**2.00**	**2.582**	**7.00**	**3.496**	**z = 2.640**	**0.008**
6 - Transfers (chair/bed)	**10**	**2.00**	**3.496**	**6.00**	**3.944**	**z = 2.271**	**0.023**

BARTHEL INDEX	1st Session of the training program			6th Session of the training program		Statistical test for paired samples	
	n	Average	Standard deviation	Average	Standard deviation	Wilcoxon Signed Ranks Test / Student's T Test	
7 - Mobility (ambulation)	10	4.50	4.972	7.00	5.375	z = 1.890	0.059
8 - Dressing up	**10**	**1.00**	**2.108**	**3.50**	**2.415**	**z = 2.236**	**0.025**
9 - Stairs	**10**	**1.50**	**2.415**	**3.50**	**3.375**	**z = 2.000**	**0.046**
10 - Bath	10	0.00	0.00	.00	.000	z = 0.000	1.000
Total	10	**20.50**	21.915	**41.50**	24.387	t = -4.466	p=0.002

When we stratified these results by the subdimensions of the Barthel Index in table 7, we found positive differences between the final and initial assessment and statistically significant in the following subdimensions: "Evacuating" (average gain of 2.50 points); "Feed" (average gain of 5.00 points); "Transfers (chair/bed)" (average gain of 4.00 points); "Dressing up" (average gain of 2.50 points); and "Stairs" (average gain of 2.00 points).

DISCUSSION

Regarding the sociodemographic data obtained from our sample, it appears that the average age of informal caregivers is 61.9 years old, close to the end of working age, which is in line with a progressively older population, as described. As for gender, it appears that female predominates (90%), which corroborates data from a 2019 study published in the OECD Health at a Glance report (2021a) in which more than 70% of informal caregivers in Portugal, aged 50 or over, they were female [30].

Regarding the other sociodemographic characteristics that stood out most among informal caregivers, they are: completed 1st or 2nd cycle education (70%); 20% are active in the job market; 60% are beneficiaries of home support. This also confirms data from the OECD (2021a) in which being an informal caregiver is associated with a reduction in integration into the labor market when of working age and a higher poverty rate [30].

Regarding the age of dependent patients receiving care, despite having a high average (80.8), their values varied greatly, ranging from 54 to 97 years old. In terms of gender, the majority are female (70%).

Regarding their clinical history, it was found that, although the vast majority had diabetes and high blood pressure, they also suffered from a wide variety of other chronic pathologies related to blood pressure functions (90%) resulting from hypertension and functions of the metabolic and endocrine system. (90%) resulting from a variety of pathologies, but which always included Diabetes. This last pathology constitutes a chronic condition with great impact in terms of disability causing cardiovascular disease, retinopathy, neuropathy, kidney failure and lower limb amputation. According to the OECD in 2019, Portugal has a high

prevalence of 9.8% compared to the average of its constituent countries, which corroborates the high prevalence found in the sample [31].

We also found a wide variety of other chronic conditions coexisting in the same patient that affect between 50 and 70% of the sample, namely bodily functions linked to the cardiac system, mental functions, blood vessel functions, hematological and immunological system functions, digestive system functions, joint and bone functions, and motor functions. This reinforces the finding in an OECD report (2021b) that these health problems represent a major factor in disability in the population, where more than 40% of the Portuguese population over 15 years of age was described as having a chronic illness or health problem. (corresponding average value in OECD countries - 33%). Also, as they observed the older population, they presented data compatible with a higher prevalence of chronic diseases and multimorbidity.

The method of applying a training program for caregivers based on theoretical-practical sessions, in a home environment, with the support of information material on paper and close supervision, proved to be very effective, with 90% of caregivers demonstrating mastery of 8 to 10 of the items. evaluated. The basic characteristics of the care transmitted may also have contributed to this result, which are compatible with the low educational level of the caregivers.

Similar methods were also successfully used and included in a 2020 systematic review [20]. More specifically, in a study by Raposo et al.[32], which consisted of training family caregivers for anti-spastic positioning in the care of stroke victims with high dependence and patients with spasticity, it was also possible to demonstrate that at the end of sessions, the caregiver masters the theoretical-practical knowledge transmitted, increasing the validity of the results obtained in the person receiving care as these are probably due to the differentiated action of the caregiver after training.

Also, the study by Santos [16] on the RN's role in training the informal caregiver made it possible to highlight the importance of the informal caregiver and home visitation in the Person's health project, as well as the fundamental role of the RN in training the informal caregiver through of health education and implemented interventions that resulted in health gains.

In our study it was found that patients receiving care from informal caregivers who were trained to approach the dependent person's body balance recover an average of **8.90** points in their body balance, this increase being statistically significant (table 6), which confirms hypothesis 1, that is, dependent patients at home, have gains in balance, when their informal caregiver is trained to approach them.

Regarding the results of the subdimensions that make up the Tinetti test, most patients scored in the 1st subdimension (assessment of sitting balance - 1st to 9th item). In contrast, in the 2nd subdimension (assessment of dynamic balance - 10th to 19th item) they had few points and in the initial assessment, most of the items assessed had a score of zero values. Therefore, from our perspective, the comparative analysis by subdimensions is not more informative compared to the analysis of the total results of the Tinetti test.

In the case study by Gil, Sousa, and Martins [33] in a 65-year-old person, previously independent and now semi-dependent in ADLs after recent hospital discharge, with changes in cognition, loss of walking ability and compromised balance, and with frailty syndrome associated. Subsequently, a rehabilitation program focused on compromised body balance and muscle

strengthening was applied, which resulted in gains in static and dynamic balance, presenting 19 points in the initial assessment (day 1) and 27 points in the final assessment (day 9) using the Tinetti Test. In other words, they saw a gain of **8** points.

In the study by Martínez-Amat et al. [34] also observed significant balance gains after applying a proprioceptive training program focused on postural control, gait, and dynamic balance and preventing falls in elderly people in the community. According to the Tinetti test, an initial average score of 22.9 and a final average score of 26.2 were observed. Thus, at the end of the program, there was an average gain in balance of **3.3** points.

In another study, carried out by Garcia et al. [18], a Rehabilitation Nursing program was also applied to the elderly linked to balance, namely proprioceptive training. According to the Tinetti test, an initial average score of 23.83 and a final average score of 27.50 were observed. Thus, at the end of the program, there was an average gain in balance of **3.67** points.

Thus, all 3 studies mentioned above corroborate our results in that the application of a rehabilitation program focused on balance leads to significant gains. However, while our study has an indirect approach, training informal caregivers for basic care related to sitting body balance, these studies use a direct intervention method being applied by different professionals, achieving high levels of balance. Therefore, despite presenting significant gains, our initial operating base is lower, presupposing the need for subsequent direct specialized intervention to also achieve higher levels of balance.

In our study, it was found that patients receiving care from informal caregivers who were trained to approach the dependent person's body balance recovered an average of **21.00** points in their level of autonomy, with this increase being statistically significant (table 7), which confirms hypothesis 2, that is, dependent patients at home experience gains in autonomy when their informal caregiver is trained to approach balance.

Also, when we analyzed the results referring to each sub-dimension of the Barthel Index in the initial and final assessment (table 7), we found gains in all sub-dimensions, except for the "Bath" sub-dimension. In this basic activity of daily living, patients remained completely dependent, scoring zero. Of these, the subdimensions in which the increase was statistically significant were: "**Evacuating**" (average gain of 2.50 points); "**Feed**" (average gain of 5.00 points); "**Transfers (chair/bed)**" (average gain of 4.00 points); "**Dressing up**" (average gain of 2.50 points); and "**Stairs**" (average gain of 2.00 points).

This assumes that the training program for the respective informal caregiver had a beneficial influence on the degree of autonomy in dependent patients cared for by informal caregivers in a home environment, especially in basic activities of daily living: control of intestinal elimination, feeding, transfers (chair /bed), clothing and use of stairs.

In the same study mentioned above by Gil, Sousa, and Martins [33], we also found gains in terms of autonomy as the program focused on balance was implemented, namely: on day 5 of the program no longer needed help from the husband for **hygiene** self-care; on the 7th, he was able to **go up and down stairs** in his home using only the handrail; on the 8th I was able to **go to the cafe** with the help of others; On the 9th, he was able to do the same route without help and without losing balance. However, unlike our study, the gains found also included instrumental activities of daily living that are more complex. This can be explained by the lower initial level of autonomy of the patients receiving care in our study.

CONCLUSION

During the preparation of this work, we sought to evaluate the contribution of a training program for informal caregivers in addressing body balance in dependent patients in a home context.

In our study, we found a sample of informal caregivers, the majority of whom are female, close to the end of working age, with an average age of 61.9 years old, with education between the 1st and 2nd cycle, inactive in the market. of work, in need of home support services.

Regarding the dependent patients receiving care, they are mostly female, with various comorbidities, but which mostly included conditions that affected body function linked to blood pressure and the metabolic and endocrine system such as hypertension and diabetes respectively, with an average age 80.8 years old, with compromised static and dynamic balance (average score on the Tinetti Test of 2.10), and with severe dependence or total dependence (average score on the Barthel Index of 20.05).

After applying the training program to the informal caregiver, we found that we achieved significant gains in the patients receiving care in terms of balance, more specifically 8.90 points in the Tinetti Test, and in terms of autonomy, more specifically 21.00 points in the Barthel Index.

There were also significant gains in the sub-dimensions: “Evacuating” (average gain of 2.50 points); “Feed” (average gain of 5.00 points); “Transfers (chair/bed)” (average gain of 4.00 points); “Dressing up” (average gain of 2.50 points); and “Stairs” (average gain of 2.00 points).

These results lead us to conclude that people at home with a high degree of dependence can benefit from basic care linked to static sitting balance, as long as their caregiver is trained to do so, contributing to gains in their balance and autonomy.

However, we must interpret these conclusions in light of the limitations inherent to the development of this specific work in a professional context, namely the limited time in which it had to be developed, and the sample size was subject to the circumstances encountered, which resulted in a smaller size than initially planned.

However, it is important to mention that the results of our study reinforce the importance of thinking about and implementing more advanced Rehabilitation Nursing programs and/or with higher objectives, to be developed in the context of home visits, thus being able to contribute to the training of the caregiver informal and health gains for the dependent person.

BIBLIOGRAPHIC REFERENCES

1. Direção-Geral da Saúde [Internet]. 2006 [cited 2021 Nov 2]. p. 4. Available from: https://www.dgs.pt/documentos-e-publicacoes/programa-nacional-para-a-saude-das-pessoas-idosas.aspx

2. Instituto Nacional de Estatística. Estatísticas de Saúde - 2019. 2021 [cited 2021 Oct 31];1–74. Available from: https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_publicacoes&PUBLICACOESpub_boui=257483090&PUBLICACOESmodo=2

3. Assembleia da República. Lei n.º 100/2019, de 6 de setembro [Internet]. Diário da República, 1ª serie nº171; Sep 6, 2019 p. 3–16. Available from: https://data.dre.pt/eli/lei/100/2019/09/06/p/dre/pt/html

4. Bento M da CS da SC. Contributos para a definição de um modelo organizacional dos cuidados às pessoas

dependentes no autocuidado e seus cuidadores, em contexto domiciliário : estudo realizado nas ECCI do ACES do Baixo Mondengo. 2021.

5. Romero DH, Stelmach GE. Changes in postural control with aging and Parkinson's disease. IEEE Eng Med Biol Mag Q Mag Eng Med Biol Soc. 2003;22(2):27–31.

6. Benjuya N, Melzer I, Kaplanski J. Aging-induced shifts from a reliance on sensory input to muscle cocontraction during balanced standing. J Gerontol A Biol Sci Med Sci. 2004 Feb;59(2):166–71.

7. Prieto TE, Myklebust JB, Hoffmann RG, Lovett EG, Myklebust BM. Measures of postural steadiness: differences between healthy young and elderly adults. IEEE Trans Biomed Eng. 1996 Sep;43(9):956–66.

8. Toubarro F. Cuidados de enfermagem de reabilitação à pessoa ao longo da vida. In Lusodidacta; 2016. Available from: https://books.google.pt/books?id=CAvstAEACAAJ

9. Walston JD. Frailty - UpToDate [Internet]. 2021 [cited 2022 Jan 10]. Available from: https://www.uptodate.com/contents/frailty?search=sindroma de fragilidade&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1

10. Freitas P, Barela JA. Alterações no funcionamento do sistema de controle postural de idosos. Uso da informação visual. [cited 2023 Nov 1]; Available from: https://doi.org/10.5628/rpcd.06.01.94

11. Januário F, Amaral C. Vol 19 I Nº 2 I Ano [Internet]. Vol. 18, Revista da Sociedade Portuguesa de Medicina Física e de Reabilitação. 2010 Mar [cited 2021 Apr 27]. Available from: https://spmfrjournal.org/index.php/spmfr/article/view/42

12. Martins T, Morim A, Sousa MR, Bastos F. A pessoa dependente e o familiar cuidador [Internet]. Edições Enfermagem. Porto; 2016. Available from: https://books.google.pt/books?id=kJaVswEACAAJ

13. Ordem dos Enfermeiros - Regulamento n.º 392/2019. Regulamento das competências específicas do enfermeiro especialista em Enfermagem de Reabilitação: Diário da República, 2.ª série — N.º 85 — 3 de maio de 2019. 2019.

14. Martins J, Albuquerque G, Nascimento E, Barra D, Souza W, Pacheco W. Necessities of education in the health of elderly in-house caregivers. Texto Context Enferm [Internet]. 2007 Apr;16(2):254–62. Available from: https://search.ebscohost.com/login.aspx?direct=true&db=ccm&AN=106200692&lang=pt-br&site=ehost-live

15. Silva M. Que intervenções do Enfermeiro de Reabilitação capacitam o cuidador informal para a continuidade dos cuidados, ao idoso com AVC, na comunidade? Que Interv do Enferm Reabil Capacit o Cuid informal para a Contin dos Cuid ao idoso com AVC, na comunidade? [Internet]. 2016 [cited 2021 Nov 2]; Available from: https://repositorio.ipsantarem.pt/handle/10400.15/1661

16. Santos CA da S. O papel do enfermeiro de reabilitação na capacitação do cuidador informal nos cuidados domiciliários : revisão da literatura. 2018 Feb 20 [cited 2021 Nov 2]; Available from: https://repositorio.ipv.pt/handle/10400.19/5465

17. Forster A, Lambley R, JB Y. Is physical rehabilitation for older people in long-term care effective? Findings from a systematic review. Age Ageing [Internet]. 2010 Mar;39(2):169–75. Available from: https://search.ebscohost.com/login.aspx?direct=true&db=ccm&AN=105310465&lang=pt-br&site=ehost-live

18. Garcia S, Cunha M, Mendes E, Preto L, Novo A. IMPACTO DE UM TREINO PROPRIOCETIVO NA CAPACIDADE FUNCIONAL DOS IDOSOS. Rev Port Enferm Reabil [Internet]. 2019 Jun 28;2(1 SE-Artigo):102–7. Available from: https://rper.aper.pt/index.php/rper/article/view/134

19. Clegg AP, Barber SE, Young JB, Forster A, Iliffe SJ. Do home-based exercise interventions improve outcomes for frail older people? Findings from a systematic review. Rev Clin Gerontol [Internet]. 2012/08/24. 2012 Feb;22(1):68–78. Available from: https://pubmed.ncbi.nlm.nih.gov/27226701

20. Stookey AD, Katzel LI. Home Exercise Interventions in Frail Older Adults. Curr Geriatr reports. 2020 Sep;9(3):163–75.

21. Shirley Hoeman. Enfermagem de Reabilitação Processo e Aplicação. 2ª Edição. Lusociência - Edições técnicas e científicas L, editor. Loures: SiG - Sociedade Industrial Gráfica, Lda.; 2000.

22. Fortin MF, Salgueiro NRM. O processo de investigação. 3ª ed. Loures: Lusociência; 2003.

23. Davies PM. Hemiplegia: Tratamento para pacientes após avc e outras lesões cerebrais. 2º ed. Editora Manole; 2008.

24. Ribeiro O. Enfermagem de Reabilitação - Conceções e Práticas. 1ª edição. Lisboa: Lidel- Edição e destribuição; 2021.

25. Nascimento M de M. Queda em adultos idosos: considerações sobre a regulação do equilíbrio, estratégias posturais e exercício físico. Geriatr Gerontol Aging [Internet]. 2019 [cited 2022 Jan 5];13(2):103–10. Available from: http://www.ggaging.com/export-pdf/534/v13n2a08.pdf

26. National Institute on Aging. Four Types of Exercise Can Improve Your Health and Physical Ability | [Internet]. 2021 [cited 2022 Jan 9]. Available from: https://www.nia.nih.gov/health/four-types-exercise-can-improve-your-health-and-physical-ability

27. Deontologia Profissional de Enfermagem. 2015.

28. Ordem dos Enfermeiros - Regulamento n.º140/2019. Regulamento n.º 140/2019 Regulamento das Competências Comuns do Enfermeiro Especialista. Diário da República; 2019.

29. DGS. Classificação Internacional de Funcionalidade, Incapacidade e Saúde. Lisboa; 2004.

30. OECD. Informal carers [Internet]. 2021. Available from: https://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-2021_0ebfc7c0-en

31. OECD. Health at a Glance 2021 [Internet]. Health at a Glance 2021. OECD; 2021 [cited 2022 Mar 11]. 274 p. (Health at a Glance). Available from: https://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-2021_ae3016b9-en

32. Raposo P, Relhas L, Pestana H, Mesquita AC, Sousa L. INTERVENÇÃO DO ENFERMEIRO ESPECIALISTA EM REABILITAÇÃO NA CAPACITAÇÃO DO CUIDADOR FAMILIAR APÓS AVC: ESTUDO DE CASO. Rev Port Enferm Reabil [Internet]. 2020 Oct 27 [cited 2021 Oct 20];3(Sup 1):18–28. Available from: https://rper.aper.pt/index.php/rper/article/view/92

33. Gil A, Sousa F, Martins MM. Implementação de programa de Enfermagem de Reabilitação em idoso com fragilidade/síndrome de desuso – Estudo de Caso. Rev Port Enferm Reabil [Internet]. 2020;3(2):27–35. Available from: https://rper.aper.pt/index.php/rper/article/view/61

34. Martínez-Amat A, Hita-Contreras F, Lomas-Vega R, Caballero-Martínez I, Alvarez PJ, Martínez-López E. Effects of 12-week proprioception training program on postural stability, gait, and balance in older adults: a controlled clinical trial. J strength Cond Res. 2013 Aug;27(8):2180–8.

ETHICAL DISCLOSURES

Contribution of the author(s):

Conceptualization: D. P.; S. M.; S. F.

Data curation: D. P.; S. M.; S. F.

Formal analysis: D. P.; S. M.; S. F.

Investigation: D. P.; S. M.; S. F.

Methodology: D. P.; S. M.; S. F.

Project administration: D. P.; S. M.; S. F.

Resources: D. P.; S. M.; S. F.

Software: D. P.; S. M.; S. F.

Supervision: D. P.; S. M.; S. F.

Validation: D. P.; S. M.; S. F.

Visualization: D. P.; S. M.; S. F.

Original draft writing: D. P.; S. M.; S. F.

Writing - review and editing: D. P.; S. M.; S. F.

All authors read and agreed to the published version of the manuscript.

Ethics Committee:

Study authorized by the Ethics Committee of the Northern Regional Health Administration (document 9-2022_20210100).

Declaration of informed consent:

Written informed consent to publish this work was obtained from participants

Interest conflicts:

The authors declare no conflict of interest.

Provenance and peer review:

Not commissioned, externally peer reviewed.