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Survival and functionality in elderly in home care

Sobrevida e funcionalidade em idosos na atenção domiciliar

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ABSTRACT
With aging, there are complications affecting the functionality and independence of individuals, often requiring continuous monitoring by health professionals, including the physical therapist. The objective was to analyze survival, functionality and the occurrence of comorbidities in elderly individuals monitored by the home physical therapy service. A cross-sectional study was carried out with 121 participants from a home care service, using the Karnofsky Performance Scale to check functionality, and the Charlson Comorbidity Index to assess multimorbidity. It was found that approximately half of the participants evaluated had functional chronicity, with potentially disabling condition, with worsening of functionality indices in individuals who have suffered some complication. The results also demonstrated that access to physical therapy increased the survival rate of the elderly and that the more frequent physical therapy follow-up enabled the functionality to be maintained.

Keywords: Aged. Home care services. Karnofsky performance status. Physical therapy modalities. Survival analysis.

RESUMO
Com o envelhecimento ocorrem complicações que afetam a funcionalidade e a independência dos indivíduos, muitas vezes sendo necessário o acompanhamento contínuo por profissionais da saúde, entre eles o fisioterapeuta. Diante disso, objetivou-se verificar a sobrevida, a funcionalidade e a ocorrência de comorbidades em indivíduos idosos acompanhados pelo serviço de Fisioterapia domiciliar. Um estudo com delineamento transversal foi realizado com 121participantes de um Serviço de Atenção Domiciliar, utilizando a *Karnofsky Performance Scale* para verificar a funcionalidade, e o Índice de Comorbidades de Charlson para avaliar as multimorbidades. Constatou-se que aproximadamente metade dos participantes apresentou cronicidade funcional, com condição potencialmente incapacitante, com piora dos índices de funcionalidade em indivíduos que sofreram alguma intercorrência. Os resultados demonstraram também que o acesso à Fisioterapia aumentou a taxa de sobrevida dos idosos e que o acompanhamento fisioterapêutico mais frequente possibilitou que a funcionalidade se mantivesse.

Palavras-chave: Análise de sobrevida. Avaliação de Estado de Karnofsky. Idoso. Modalidades de fisioterapia. Serviços de assistência domiciliar.

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INTRODUCTION

As in other countries in the world, changes in the demographic and epidemiological profile in Brazil also require adaptation of the health care model, making it a strategic point of care. The population aging process is a factor that drives health systems' concern about new models of care.[1]

With the dynamics of aging and the various losses arising from this process, there is the occurrence of Chronic Noncommunicable Diseases (NCDs), which can make the clinical condition of individuals critical. As a consequence, there is a decline in functionality that compromises independence in Activities of Daily Living (ADLs) and negatively influences the quality of life of the elderly, increasing their vulnerability.[2,3] Therefore, the elderly often need to be regularly monitored by health professionals.

One of the strategies proposed by the Unified Health System of Brazil (SUS) for subjects who are in this situation was the creation of the Home Care Service (HCS), with activities aimed at humanization, associated with the integration of actions between public health services.

In the HCS, established by Ordinance 2,029, of August 24, 2011, and redefined by Ordinance 825, of April 25, 2016, the physical therapy service is an integral part of the multiprofessional team. Still, according to the Ordinance, home care is divided into AD1, AD2 and AD3, according to the stage at which the disease is, the need for care and the number of weekly visits. In this stratification, individuals at AD1 are covered by Primary Care (FHS) and individuals at AD2 and AD3 covered by HCS, which, in turn, accompany those who need assistance in medium and high complexity, at any age, mostly bedridden and who demand to be monitored at least once a week.[1,4,5]

Thus, the physical therapist, in the home environment, guides and trains caregivers, performs motor, respiratory physical therapy and approach in palliative care, according to the physical, human and/or technological resources available.[6,7,8] Thus, the use of a functional evaluation represents a relevant instrument to determine the adequate diagnosis and prognosis of the individuals followed.[9,10]

Due to the growth in life expectancy of Brazilians, the chronification of NCDs and the lack of a home care service aimed at the real needs of individuals[11,12], the objectives established for this research were: to check the survival in the elderly who underwent physical therapy of the HCS in a Brazilian municipality; to evaluate the functionality of the elderly according to the Karnofsky Performance Scale (KPS); to ascertain the time elapsed until the event (hospital readmission or death) related to the number of physical therapy visits and the number of associated diseases in the elderly. The findings of this investigation may contribute to future studies with new perspectives on other intervention models related to prevention, recovery and/or quality of life for bedridden elderly.

METHODOLOGY

TYPE AND SAMPLE OF THE STUDY

A retrospective, quantitative cross-sectional study was carried out at the HCS of the Municipality of Londrina, state of Paraná, with data obtained during 2012. The information of 121 people aged 60 and over, admitted to the HCS, and accompanied by the physical therapy service. Exclusion criteria were considered individuals undergoing outpatient physical therapy concomitant with care at the HCS, and those who were not referred to the physical therapy service by medical professionals.

PROCEDURES FOR DATA COLLECTION, INSTRUMENTS OF EVALUATION AND CATEGORIZATION

The administrative database of the Patient Registry and the Monthly Service List of the physical therapy team at HCS – Londrina, state of Paraná, were used to obtain the sociodemographic information of individuals such as: sex, age, marital status, education, family income (calculated in minimum wages), occupation, housing situation and sanitation, in addition to the number of physical therapy visits performed, type of physical therapy (respiratory or motor), length of time that individuals remained in the physical therapy service, clinical diagnosis and associated comorbidities. Caregiver information was also collected.

The Charlson Comorbidity Index (CCI) was used as a measure to check survival according to multimorbidity and the KPS to analyze the functional performance indices at the beginning and at the end of the hospitalization period (in percentage). Data were collected by the HCS teams during the admission visit, after receiving the referral by the service. The following instruments were used as an evaluation protocol:

1) Monthly List: Used by the physical therapy service, which contains the list of individuals followed by each team, the record of the professional who provided the service, as well as the number of services and the type of therapy performed (respiratory and/or motor). This instrument is sent to the HCS administrative sector on a monthly basis.

2) KPS: Scale used to classify the subject in relation to his/her functional performance, being able to even compare the result or the effects of applied therapies through their resolution and possible changes in the patient's prognosis. It consists of terms that encompass the different levels of autonomy and functional capacity, with scores ranging from 0 to 100 (0 means death and 100 the normal individual, with no evidence of disease or complaints).[13]

In this research, participants' functionality was categorized into

improvement, worsening, death or chronicity, relating the initial and final results of the KPS.

3) CCI: Tool commonly used in epidemiological clinical studies that takes into account the simultaneous existence of one or more diseases.[14] For this study, in order to obtain two homogeneous groups, the results were grouped according to the median: Group A (GA) - with a score between zero and two; and Group B (GB) - with a score above two.

As an outcome of this study, the events of hospital readmission and death of the participants were considered.

DATA ANALYSIS

As for statistical analysis, the Shapiro-Wilk test was applied to check the normality of data, such as: length of stay in the service, total number of physical therapy visits, number of physical therapy visits (respiratory and motor) and percentage of KPS. Data were presented as median and interquartile ranges as they did not show normal distribution ($p \geq 0.05$). The Kaplan-Meier method was used to estimate the survival function, with a Log Rank test to compare the survival curves among participants who had a CCI from zero to two and greater than two, and when comparing those who had from one to six visits (Group 1 - G1) and more than six visits (Group 2 - G2), observing the time until hospital readmission or death. In order to check the time until readmission or death, we used the total number of follow-ups, grouped according to the median. Finally, the Wilcoxon test analyzed the difference between the initial and final percentages of KPS. A significance level of 5% ($p \leq 0.05$) was considered for all tests performed. Statistical analyses were performed using the Statistical Package for the Social Sciences - SPSS® software, version 20.0 for Windows.

ETHICAL ASPECTS

The study was approved by the Research Ethics Committee Involving Human Beings at Universidade Norte do Paraná (UNOPAR) under the opinion of the Certificate of Presentation for Ethical Appreciation (CAAE) 276,654/13 in 2012, and was authorized by the Municipal Health Authority. All participants signed the Informed Consent Form.

RESULTS

The study included 121 subjects with an average age of 75.17 years (± 8.98 years), of which 59 (48.8%) were men and 62 (51.2%) were women. Of the individuals analyzed, 71 (58.7%) used continuous or intermittent oxygen therapy and 50 (41.3%) did not use oxygen therapy.

Table 1 lists information about the length of stay in the physical therapy service (in days), the total visits to physical therapy and the type of physical therapy employed (respiratory or motor).

Table 1. Panorama of the physical therapy service at the HCS, Londrina, state of Paraná, 2012

	Length of stay in the service (days)	Total visits to physical therapy	Type of physical therapy	
			Respiratory physical therapy (number of visits)	motor physical therapy (number of visits)
Total	364	1188	1058	555
Median	142.00	6.00	5.00	2.00
1st Quartile	35.50	3.00	2.00	0.00
3rd Quartile	312.50	14.00	13.00	6.00

Table 2 lists the sociodemographic data of the elderly (marital status, occupation, education and family income). The analysis shows most individuals who presented the events (hospital readmission or death) were not married (24 - 55.9%), were retired (29 - 67.4%), literate (22 - 51.2%) and with family income between 1 and 3 minimum wages (32 - 74.4%).

Table 2. Sociodemographic characteristics of the elderly, Londrina, state of Paraná, 2012

Characteristic	Total		Maintenance/Improvement		Readmission/Death	
	N	%	N		N	%
Marital status						
Single	5	4,2	3	3,8	2	4,7
Married	53	43,8	34	43,6	19	44,2
Divorced, legally	12	9,9	8	10,3	4	9,3
Widowed)	51	42,1	33	42,3	18	41,9
Total	**121**	**100**	**78**	**100**	**33**	**100**
Occupation						
Retired	73	60,3	44	56,4	29	67,4
Formal	15	12,4	9	11,5	6	14,0
Informal	10	8,3	6	7,7	4	9,3
Others	23	19,0	19	24,4	4	9,3
Total	**121**	**100**	**78**	**100**	**43**	**100**
Education						
Illiterate / functional illiterate	48	39,7	27	34,6	21	48,8
Elementary school (8 years of schooling)	68	56,1	49	62,8	19	44,2
High school (3 years of schooling added to the Elementary school)	3	2,5	1	1,3	2	4,7
Higher education	2	1,7	1	1,3	1	2,3
Total	**121**	**100**	**78**	**100**	**43**	**100**
Family income						
< 1 MW[a]	7	5,8	5	6,4	2	4,7
From 1 to 3 MW	95	78,5	63	80,8	32	74,4
From 4 to 6 MW	16	13,2	9	11,5	7	16,3
> 6 MW	3	2,5	1	1,3	2	4,7
None	-	-				
Total	**121**	**100**	**78**	**100**	**43**	**100**

MW = minimum wage, 2012.

Table 3 shows the survival analysis of the elderly according to the number of visits. It contains all individuals in G1 (subjects who had one to six visits) and in G2 (subjects who had more than six visits), the total and the percentage of those who presented the two events or only one of them, the mean value and the standard deviation (in days) of the participants who were followed up by the physical therapy service.

Table 3. Survival analysis of the elderly according to the number of visits, Londrina, state of Paraná, 2012

Visits	Total	Events						Days spent in the physical therapy service		
		Yes				No				
		Death		Readmission						
		N	%	N	%	N	%	Median	1st Q / 3rd Q	95% CI
G1 (1 a 6)	63	15	23,8	13	21,6	35	55,6	197,34	22,67	(161,53 - 203,04)
G2 (> 6)	58	8	13,8	7	12,1	43	74,1	300,20	15,67	(296,07 - 304,32)
Total	**121**	**23**	**19,0**	**20**	**16,5**	**78**	**64,5**	**246,53**	**14,69**	**(243,88 - 249,17)**

Log Rank (Chi-square = 13.48 and p < 0.001; G1 = Group 1; G2 = Group 2; Q = Quartile; 95% CI = 95% Confidence Interval).

Table 4 lists the survival of the elderly according to comorbidities. It describes the totality of individuals in GA or GB, the total and the percentage of participants who presented the two events or only one of them, the mean and standard deviation (in days) of the participants who were followed up by the physical therapy service. For the Charlson Comorbidity Index (CCI), GA totaled 77 individuals and GB, 44 individuals. In GA, 15 (19.6%) participants died and 9 (11.6%) were readmitted, that is, 24 (31.2%) individuals presented the events of hospital readmission or death. Otherwise, in GB, 8 (18.2%) participants died and 11 (25%) were readmitted, totaling 19 (43.2%) individuals who had the events. There was no statistically significant difference between the groups in the Kaplan-Meier curve (p = 0.118).

Table 4. Survival analysis of the elderly according to the comorbidities assessed by the Charlson index, Londrina, state of Paraná, 2012

Comorbidity	Total	Events						Days in the physical therapy service		
		Yes				No				
		Death		Readmission						
		N	%	N	%	N	%	Mean	SD	95% CI
GA (0 a 2)	77	15	19,6	9	11,6	53	68,8	197,34	22,67	(192,19 - 202,48)
GB (> 2)	44	8	18,2	11	25,0	25	56,8	300,20	15,67	(295,43 - 304,96)
Total	**121**	**23**	**19,0**	**20**	**16,5**	**78**	**64,5**	**246,53**	**14,69**	**(243,88 - 249,17)**

Log Rank (Chi-square = 2.45 and p = 0.118; GA = Group A; GB = Group B; SD = Standard deviation; 95% CI = 95% Confidence Interval).

Figure 1 illustrates the analysis of the function of the time until hospital readmission or death according to the total number of visits and the length of stay in the physical therapy service. The results found that 43 participants died or were readmitted, of which 23 (19.0%) died and 20 (16.5%) were readmitted. When comparing the events between G1 and G2, it was found that in G1, 15 (23.8%) participants died and 13 (21.6%) were readmitted, whereas in G2, 8 (13.8%) died and 7 (12.1%) were readmitted. The difference between G1 and G2 was statistically significant ($p \leq 0.001$) for the existence or not of events. The results also showed that the number of visits is related to the time for the occurrence of events (hospital readmission or death). These visits, according to the need or severity of each individual, took place in different ways throughout the year. Relating G1 to G2, individuals of G2 showed less relation to events ($p \leq 0.001$). Most events occurred up to the initial 60 days of follow-up in the group with the lowest number of visits (G1), when compared to the group that had the most visits (G2). According to the KPS categorization, it was found that 56 (46.3%) participants had a chronic functional profile (preserving the same result on the scale), 17 (14%) improved, 19 (15.7%) worsened and 29 (24%) died.

The mean KPS in individuals who were readmitted or died was 42.7 (SD ± 12.21) at the beginning, and at the end it was 7.20 (SD ± 12.40). In the group with improvement or unchanged status, the initial mean was 48.71 (SD ± 14.35) and the final was 49.49 (SD ± 15.44). Therefore, when comparing the groups, in these two moments, statistically significant differences were detected by the model corrected for time of maintenance in the physical therapy service ($p \leq 0.001$).

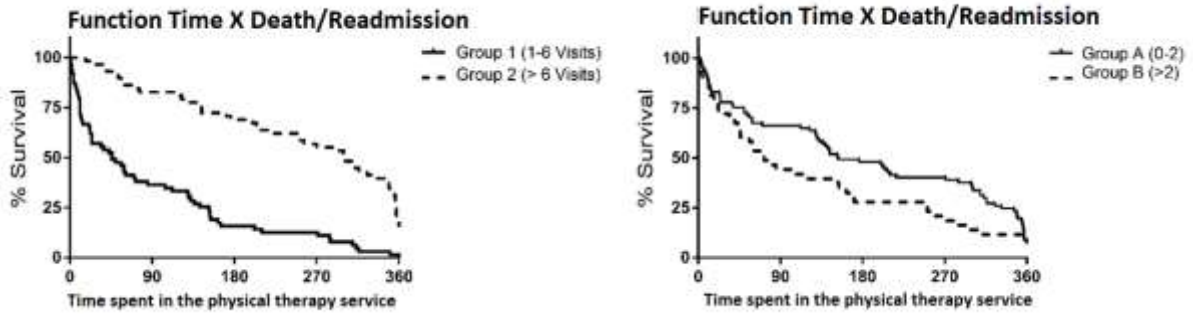

Figure 1. Survival analysis of the elderly according to the total number of visits and length of stay in the physical therapy service (in days) on the left, and, on the right, the survival analysis of the elderly according to the comorbidities assessed by the Charlson index, Londrina, state of Paraná, 2012.

DISCUSSION

The results showed that, when investigating the survival of the elderly, the group that had more than six visits to physical therapy had a smaller number of events, which occurred gradually over time.

In a survey conducted in a Brazilian state analyzing the prevalence of types of physical therapy performed in a group that was in home care, the authors found that to produce better results, the beginning of physical therapy should occur early.[7] This is confirmed by the findings of this study, which verified the existence of a greater number of events in the first 60 days, in both groups analyzed. Thus, it demonstrates the importance of more physical therapy assistance as an aid in stabilizing clinical conditions and reducing the chronicity of diseases.

Another important aspect verified in the present study was the analysis of the functionality of the elderly according to the indices obtained in the KPS. It was found that the participants, at the end of the study, preserved the functionality initially evaluated (they were in a potentially disabling condition, which required specific care). Similarly, it is important to note that individuals with a score less than 40 in KPS, may have a longer survival.[13]

One of the relevant aspects that should be considered when using a scale to predict survival, such as KPS, is its application incomplexity and effectiveness in analyzing the functionality and prognosis of individuals who have chronic and severe conditions. It is also considered that there is no need for complementary serum tests. The analysis of the functional capacity of the elderly, in order to assess the prognosis in different contexts in the health network, is a fundamental factor.[14]

A group of elderly individuals was the subject of study at the HCS of Curitiba, state of Paraná, in which the Palliative Performance Scale (PPS), Karnofsky Performance Scale (KPS), Palliative Prognostic Index (PPI) and Palliative Prognostic Score (PaP) were compared as to the accuracy in predicting survival. It was found that no prognostic scale is superior to the others.[15]

Regarding the assessment of the association of comorbidities with the survival of the elderly, it was concluded, in this study, that there was no significant difference when comparing the number of associated diseases and the events of hospital readmission or death. In another research, different results were reported when using the CCI to ascertain the correlation between comorbidities, risk of death and readmission in the elderly. The authors showed that the highest risk of death after hospitalization was directly related to the severity of comorbidities.[14]

A survey carried out in an outpatient setting analyzed the impact of frailty, multimorbidity and functional disability on the survival of the elderly. The study concluded that frailty negatively affected the survival of these individuals.[16] Nevertheless, there was no statistically significant association with regard to multimorbidities and functional loss. It is worth mentioning that the referred study did

not analyze the therapeutic support in the different conditions, which could have resulted in different outcomes.

Research on the dynamics of aging, the associated health situations and the impact of functionality on the quality of life of the elderly, increasingly, analyze the association of diseases in terms of their outcomes, including death.[16] However, among the potential limitations the present study highlights the scarcity of studies in the literature with elderly people monitored in home care and who investigate how the physical therapy service can increase the survival of these individuals.

Therefore, this study can contribute to future investigations related to the theme, in addition to guiding and assisting the implementation of physical therapy services in HCS, as well as the planning and management of home care teams in the health network.

CONCLUSION

As the findings of this investigation demonstrate, the elderly followed up by the HCS in Londrina, state of Paraná, had potentially disabling comorbidities, which significantly impaired the functionality of these individuals.

It is emphasized how important is the systematic assessment of the clinical condition of the elderly using instruments such as KPS, in the identification of degrees of vulnerability and, also, as an auxiliary resource for health professionals in the design of prevention and treatment actions.

The increase in survival and the reduction in events, such as hospital readmission or death, were associated with more physical therapy sessions, a fact that contributed to the maintenance of the participants' initial functionality. This is an important point when linked to clinical treatment, as it favors the reduction of referrals to the hospital, and consequently minimizes the clinical, functional and emotional complications inherent to the permanence of the elderly in this environment.

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