ORIGINAL ARTICLE

Physical activity levels of a primary health care users: comparisons between healthy subjects and subjects with stroke

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ABSTRACT

Subjects with stroke have a low physical activity level which may lead to recurrence of stroke events, occurrence of other cardiovascular diseases and increase of disabilities. The maintenance of an adequate physical activity level is associated with improvements on functionality and health of these subjects. **Objective:** To compare the physical activity levels of subjects with stroke and matched healthy subjects from a Primary Health Care unit. **Method:** Subjects with stroke (G1; n = 37) from a Primary Health Care unit, with clinical conditions to answer a questionnaire, and healthy matched subjects (G2; n = 37), from the same unit, were assessed for physical activity level by the Human Activity Profile (HAP) questionnaire. Descriptive statistics, t-test student, chi-square test and Mann-Whitney test were used for analysis ($\alpha = 0.05$). **Results:** The groups were similar in age, sex and exercise level ($p>0.05$). There was a significant difference between groups on HAP ($0.001 \leq p \leq 0.011$). **Conclusion:** Individuals with stroke are worse classified and have worse scores on physical activities levels of the HAP, when compared to matched healthy individuals.

Keywords: Stroke, Physical Therapy Modalities, Human Activities, Unified Health System

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INTRODUCTION

The Cerebral Vascular Accident (CVA or Stroke) is an important health disease to the world population as well as one of the most relevant causes of disabilities in Brazil and in the world.[1,2] The prevalence of stroke is high and 90% of the survivors undergoes functional commitments that involve structural and functional diseases, limitations in the activities of the daily life and participation restrictions.[3,4] Moreover, most of these individuals have sedentary life style and reduction of physical activities, what is defined as any body movement as a consequence of muscle contraction that results in energy expenditure.[5,6] The level of physical activity is globally related to daily life activities, leisure, and labor activities.[7]

Some worldwide studies have evidenced that stroke patients have lower physical activities practices when compared to healthy elderlies and even when compared to those with cardiovascular o musculoskeletal chronic diseases.[5,8] Moreover, the lower level of physical activities is, however modifiable, a relevant risk factor for the development of cardiovascular diseases, for stroke recurrence, and for the increase of disabilities.[5]

According to clinical guidelines,[5,9] thirty minutes of daily physical exercise may reduce the risk for cardiovascular diseases. Additionally, 10,000 daily steps or an equivalent in terms of metabolic expenditure (MET) is considered criteria to classify an individual as active, with lower risk for cardiovascular diseases and recurrences of stroke.[10] However, stroke patients usually do not follow this advice and bear a lower level of physical activities, what increases their risk to cardiovascular events.[5,9-11]

A good level of physical activities is associated to a better cardiovascular capacity to reduce fatigue, to an increase in muscle strength, to a better gait ability, as well as to a reduction in depressive symptoms and improvement in quality of life.[5,11] Therefore, increasing and/or maintaining an adequate level of physical activity of this population is essential for any healthcare professional that assists these patients.

Whenever the level of physical activity of these patients is reported in clinical trials, this is considered a secondary outcome or a sample characterization variable, what limits the result interpretation.[12-15] Therefore, it is essential to profile the level of physical activities of stroke patients of primary care of a public health system. A primary healthcare unit (UBS), the first contact of a patient with the Brazilian pubic healthcare system, also has the competence to monitor, to follow up, and to assist stroke patients regarding rehabilitation, prevention of disabilities and stroke recurrence, or prevention of other diseases, as well as the competence to promote functionality and general health.[16-18]

Additionally, the awareness of the physical activities level of a specific population of a determined region, it is possible to identify the common needs of patients in similar conditions. This knowledge may better address the healthcare and health strategies that is offered to these populaions.[19]

OBJECTIVE

This study has the objective to compare the level of physical activities (PA) of healthy individuals and patients with stroke of a primary care unit (PCU) in the city of *Belo Horizonte*, state of *Minas Gerais*, Brazil.

METHODS

This is an exploratory study based on historical data of stroke patients and healthy counterparts of a PCU in the city of *Belo Horizonte*, state of *Minas Gerais*, Brazil. This study was approved by the Ethics Committee Board *Comitê de* Ética *em Pesquisa (COEP)* of a university and by the City Health Board of the state of *Belo Horizonte*, Brazil.

Initially, eligible stroke patients of the PCU were identified within the family health support team. Along the identification of the patients, their medical reports were analyzed, and eligible patients were contacted and invited to participate and sign the informed consent form.

To join this study, the stroke patients should meet the following inclusion criteria: clinical diagnosis of primary stroke six or more months before the inclusion; resident of the surrounding area of the PCU; user of the Brazilian public health care and subscribed in the PCU; 20 years of age or older; sign the informed consent form. The excluded patients were those who did not have clinical conditions to respond the questionnaires, such as sensitive and/or motor aphasia and cognitive deficit evaluated by the Mini Mental State Examination (MMSE) with cutoff scores of 13 to illiterate, 18 to individuals with 1 to 7 years of formal education, and 26 for those with 8 or more years of formal education.[20,21]

Healthy individuals of the same PCU, paired to the stroke patients concerning age, sex and level of physical activities[22] were also invited to join in the study. They were evaluated according the following inclusion criteria: resident of the surrounding area of the PCU; user of the Brazilian public health care and subscribed in the PCU; 20 years of age or older; sign the informed consent form. The excluded counterparts were those who did not have clinical conditions to respond the questionnaires, such as sensitive and/or motor aphasia and cognitive deficit evaluated by the Mini Mental State Examination (MMSE)[20,21] with cutoff scores as described previously. Presence of health condition that could interfere with the level of physical activities, such as uncontrolled systemic arterial hypertension and/or diabetes mellitus and other neurological or orthopedic disturbances.

All the data was collected by a single previously trained rater who was assisted by another rater. Based on the medical records, clinical-demographic data of the stroke patients were collected for sample characterization, such as age, sex, education, number, type and time after stroke. After the data collection of the medical records, and after a primary phone contact, the patients were visited in their homes in which the eligibility criteria were checked, and the medical record data was confirmed. The patients were assessed concerning their physical exercise level,[22] the degree of motor disability (Fugl-Meyer Assessment),[23] and their level of physical activities (Human Activity Profile – HAP).[24]

Healthy subjects that were in a waiting room of the PCU were invited to voluntarily join in the study. They were companion of patients to be attended at the PCU. Any individual that checked in the PCU looking for medical help were not considered healthy, therefore they were not invited or included in this study. All healthy individuals who met the inclusion and pairing criteria were included, had their clinical and demographic data collected (age, sex, education, and level of physical exercise[22]). Then, they responded the HAP questionnaire. The HAP has measure properties to adequately evaluate the physical activity level of either stroke patients or healthy individuals.[24,25] This evaluation tool

has 94 items related to routine activities, with different functional levels regarding the domains of activity and participation of the International Classification of Functioning, Disability and Health (ICF), what allows the evaluation of healthy individuals or those with some degree of impairment of any age group. The items of this evaluation are ordered according to the activities, from the lowest to the highest energy expenditure. The possible answers to the items are "still doing this activity", "stopped doing this activity", or "never did this activity". Based on their answers, a Maximum Activity Score (MAS) is calculated, which is the score of the highest energy expenditure activity that the individual "still do", as well as the Adjusted Activity Score (AAS), which is calculated by subtracting from the MAS the number of items the individual "stopped doing", before the last one he "still do". The AAS is a stable estimate of the daily activities once it represents the average level of the equivalent MET of a regular day. This simple quantification method allows a quick and significant measure of changes in the level of energy expenditure and the comparison between distinct levels of activities of healthy people and people with disabilities.

With AAS and MAS, and tables from the HAP manual,[26] it was possible to obtain the following classifications: age of activity, activity classification, and physical fitness classification. The age of activity is obtained by the MAS and the age and is classified as low or adequate. The activity classification is obtained by the AAS as follows: AAS lower than 53, disabled (inactive); AAS between 53 and 74, moderately active; and above 74, active. At last, there is the physical fitness classification that is obtained by the AAS and the age, classified as low, mild, medium, and high physical fitness.[24,26] In this present study, the participants were classified according to all the classification given by HAP.[24,26]

Descriptive analyses were performed to all variables of our study and Shapiro-Wilk normality tests were carried out for the quantitative variables (such as age). For the quantitative variables normally distributed (age), the mean and standard deviation was calculated. The other variables (MAS and AAS) were summarized as medians and interquartile differences. The categorical variables, such as sex, level of physical activity and the classifications of HAP were summarized as absolute and relative frequency (%). For comparing the groups, the statistical tests used was Student t-test (age), qui squared (sex) and Mann-Whitney (level of physical exercise and HAP classifications). All the analyses were carried out with the SPSS® for statistical pack for Windows (Version 17.0, SPSS Inc., Chicago, Illinois, USA) and the significance level was set at α=5%.

RESULTS

44 stroke patients were identified, and 37 patients were included (G1) after meeting the inclusion criteria. Seven patients were not able to respond to the HAP (unable to speak due to tracheostomy or presence of motor and/or sensitive aphasia, or diagnosis of severe dementia). From these 37 individuals, most of them were male (51.4%, n=19), with 68.6±12.0 years of age, with complete primary school (43.2%, n=16), and incomplete primary school (35.2%, n=13) were the most prevalent patients. Regarding the stroke characteristics, the average time after stroke was 72.68±69 months and most of the individuals had moderate motor impairment (35.2%, n=13) to severe impairment (32.4%, n=12). Also, 37 paired healthy individuals were included (G2), with mean age of 68.9±12.16 years. There was no significant statistical difference between both groups regarding the pairing variables (age, sex, and level of physical exercise) (Table 1).

Table 1. Clinical-demographic characteristics of the stroke patients (G1; n=37) and their counterparts (G2; n=37)

Characteristics	G1	G2	Statistical test	*p*
Age (years)	68.6±12.0	68.9±12.16	Student t-test	0.96
Sex				
Male	19 (51.4%)	19 (51.4%)	Qui-squared	0.81
Female	18 (48.6%)	18 (48.6%)		
Level of physical exercise				
Inactive	32 (86.5%)	32 (86.5%)		
Insufficient	2 (5.4%)	2 (5.4%)	Mann-Whitney	1
Vigorous	3 (8.1%)	3 (8.1%)		
Education				
Illiterate	4 (10.8%)	1 (2.7%)		
Incomplete primary school	13 (35.2%)	11(29.7%)		
Complete primary school	16 (43.2%)	8 (21.6%)	NA	NA
Complete secondary school	2 (5.4%)	4 (10.8%)		
Complete high-school	2 (5.4%)	9 (24.4%)		
College degree	0 (0%)	4 (10.8%)		
Time after stroke (months)	72.68±69	NA	NA	NA
Stroke type				
Ischemic	25 (67.6%)	NA		
Hemorrhagic	7 (18.9%)	NA	NA	NA
Unknown	5 (13.5%)	NA		
Stroke occurrences				
One event	27 (73%)	NA	NA	NA
Multiple evets	10 (27%)	NA		
Hemiparesis				
Right hemiparesis	17 (45.9%)	NA	NA	NA
Left hemiparesis	20 (54.1%)	NA		
Motor impairment				
Severe	12 (32.4%)	NA		
Evident	9 (24.3%)	NA		
Moderate	13 (35.2%)	NA	NA	NA
Slight	2 (5.4%)	NA		
No motor impairment	1 (2.7%)	NA		

NA: not applicable

The Table 2 presents the results of the descriptive statistics of the HAP variables, as well as inferential statistics of the comparison between both groups. As the data shows, there was significant statistical difference between both groups regarding all HAP variables ($0.001 \leq p \leq 0.011$). In short, the stroke patients (G1) presented worse scores or classifications when compared to their healthy counterparts (G2) for all the outcomes of physical activity related aspects of HAP.

DISCUSSION

The objective of this study was to compare the level of physical activity (PA) of healthy individuals and stroke patients of a primary care unit of the Brazilian public healthcare system. The stroke patients evidenced worse physical activities profile of all HAP scores and classifications compared to their healthy counterparts.

The sociodemographic data of our study revealed a slight larger participation of men, with approximately 70 years of age, with education in between complete and incomplete primary school. These data are similar to what is found in the literature, which shows stroke patients are predominantly illiterate or low educational background males from 60 to 74 years of age.[19,27] We emphasize that most of the patients included in our study (89.2%, n=33) had low educational background. This can be a limiting factor regarding the information on their health condition, and regarding prescriptions, treatments and therapies that chronic diseases, like stroke, demand, as well as their need to maintain an adequate level of physical activity.[19,27] Concerning the Fugl-Meyer Assessment results, most of the patients were moderately or severely disabled. Other studies in which disability after stroke was evaluated, the motor impairment was similar.[28]

Braun et al.,[12] who studied 19 chronic stroke patients in the city of Florianópolis, Brazil, and evaluated the relationship between postural balance, level of physical activity and quality of life, found MAS of 71±12 and AAS of 48±16 with activity classification of 52.6% inactive, 42.1% moderately active, and 5.3% active patients. These results are similar to our findings. Therefore, combined, both studies evidence patients with chronic stroke present low level of physical activity. It is important to indicate that in our study other outcomes for rating the physical activity of chronic stroke patients were used: physical fitness classification (a general classification of the physical fitness compared to healthy counterparts), and the activity age (what shows the equivalent age to the level of activity of the subject).[26]

Moreover, in our study we compared the score and classifications of HAP of stroke patients with their healthy counterparts, what adds new information and a better and more complete characterization of the physical activity of this population.

Concerning the comparison of the physical activity level of stroke patients and healthy comparable counterparts, the information found in the literature is limited. Ashe et al.,[8] in their study for determining the level of physical activity of healthy elderlies and comparing it with chronic diseased patients, including stroke, found that stroke patients have lower level of physical activity when compared to healthy elderlies, and higher inactivity proportion when compared to patients with other chronic diseases.[8]

In their results, Ashe et al.[8] found similar evidence when compared to our study. However, in our study we sought to pair the participants on their age, sex and level of physical exercise, once they are possible confounders to the analysis of physical activity, and such pairing was not implemented by Ashe et al.[8] Moreover, the participants of our study belonged to the same region, were users of the same primary care unit, and, therefore, had in general similar characteristics that could influence their level of physical activity. Their and other study results assure that stroke patients have specific characteristics and impairments that cause their low level of physical activities.[5,8,12]

One of the variables used for pairing the groups of our study was the level of physical exercise,[22] what can be defined as subcategory of the physical activity that is planned, structured and repetitive, which in turn has the objective to improve or maintain one or more variables of physical fitness.[6] In both groups, most patients were classified as inactive, with a sedentary lifestyle. Even with this pairing, the stroke group had lower score and classification in the HAP. Therefore, it is emphasized the relevance to clearly define the measurement (level of physical exercise or level of physical activity) and to measure the level of physical activity of these patients, once, even with the same level of physical exercise, stroke patients had worse level of physical activities when compared to healthy counterparts. Possibly, the impairment and incapacity imposed by the stroke may be factors that interfere in the level of physical activity.[5,8]

According to Billinger et al.[5] the alterations and motor deficits of mobility and balance may result in a prevalent physical inactivity of stroke patients, hindering and diminishing the physical fitness and the sedentary lifestyle of this population. The physical inactivity is a risk factor for incapacities, activity limitations and participation restriction, as well as for occurrence of new cerebrovascular events. Most stroke patients that were included in our study presented moderate or severe motor impairment as classified by the Fugl-Meyer Assessment. Therefore, it is possible that the motor changes after stroke are associated to the low level of physical activity, as evidenced in the results of

Table 2. Level of physical activity of stroke patients (G1; n=37) and healty counterparts (G2; n=37) measured by the HAP

HAP variables	G1	G2	p
MAS	71±23	76±17	0.009
AAS	46±46	60±11	0.011
Age of the activity			
Below recommendation	26 (70.3%)	15 (40.5%)	0.011
Adequate	11 (29.7%)	22 (59.5%)	
Activity Classification			
Inactive	22 (59.5%)	7 (18.9%)	0.002
Moderately active	12 (32.4%)	27 (73%)	
Active	3 (8.1%)	3 (8.1%)	
Physical fitness			
Low	18(48.6%)	6 (16.2%)	<0.001
Mild	7(18.9%)	3 (8.1%)	
Average or above average	12(32.4%)	28 (75.7%)	

MAS: Maximum Activity Score, AAS: Adjusted Activity Score

our study. Given the complexity related to the level of physical activity, it is important to affirm that other variables, beyond the impairment and motor changes, may be associated, what may be investigated in future studies. Understanding these variables and their impact with the level of physical activity is essential to formulate a better approach regarding the increase of physical activities of these patients.

It is substantial that stroke patents embrace an active lifestyle and the constant practice of regular physical activities, once it may avoid the occurrence of new stroke episodes, and it may provide adequate level of functionality and health.[5,29] It is suggested the health professionals comprehend the benefits of a suitable level of physical activity, applying the recommendations by prescribing interventions that increase the level of physical activity of stroke patients.[5] Clinical guidelines regarding stroke patients rehabilitation recommend these patients to join in continuous physical exercises programs.[29,30]

Such programs, that may be offered in their community and in groups, already have evidenced based benefits: they provide social integration, and they are excellent strategies to provide regular practices of physical activity at a low cost, when compared to other programs that require individual monitoring.[31] A physical exercises program for stroke patients have proven improvements in functional outcomes, such as muscle strength, postural balance, flexibility, mobility, and corporal perception. Additionally, they also provide and enhance possibilities of activity and participation, yielding general health and quality of life improvements.[5,31]

Therefore, the results of our study have evidenced that the health professionals need to systematically monitor and provide strategies and programs for encouraging stroke patients to practice and improve regular physical activities. Moreover, it is important that these professionals establish primary interventions for prevention of the risk factors for the development of stroke and other chronic disabling diseases, as well as interventions of health promotion towards the whole population.

Two relevant limitations of our study were the enrollment of participants of a single primary care unit and the inclusion of stroke patients at the chronic stage of the disease. However, once it is the first study to include the assessment of physical activity level of a non-convenience sample, and to compare them with healthy counterparts, our results added relevant information for guiding future studies and interventions regarding the monitoring and care for a better functionality and health of stroke patients.

CONCLUSION

Stroke patients of a primary care unit of the city of *Belo Horizonte*, *Minas Gerais*, Brazil had low level of physical activity when compared to healthy counterparts in all outcomes of HAP. The understanding of the physical activity level of these patients must signal healthcare teams regarding the need to design strategies for the promotion of healthy lifestyle and the prevention of risks factors, as recommended for stroke patients by the Health Officials and international clinical guidelines.

We expect that the findings of this study may reinforce the relevance of preventive interventions and of health promotion addressed towards positive results, functionality, and health of stroke patients. We also expect that these interventions may be addressed to all population, so that the incidence and recurrence of disabling and chronic diseases, as stroke, are diminished.

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