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ORIGINAL ARTICLE

CASE MANAGEMENT FOR PEOPLE WITH STROKE: QUASI-EXPERIMENTAL STUDY

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ABSTRACT

Objective: to compare the effect of intervention by nurse-case manager on risk factors and blood pressure in post-stroke people. Method: quasi-experimental study conducted over six months with 14 post-stroke patients in southern Brazil. The intervention with case management consisted of nursing consultations, individualized educational actions and referrals to other professionals, operationalized in three home visits and six telephone contacts. For data analysis, descriptive statistics and Fisher's test were used, with a significance level of $p \leq 0.05$. Results: Reduction of smoking ($p=0.0414$), alcohol intake ($p=0$), sodium consumption ($p=0.0024$), fat ($p=0.0027$), carbohydrate ($p=0.0203$) and sugar ($p=0.0111$), increased physical activity ($p=0.0382$) and non-significant reduction of blood pressure levels were observed. Conclusion: Nurse-led case management is a valid strategy to follow people recovering from stroke.

DESCRIPTORS: Case Management; Stroke; Nursing Care; Patient Care Planning; Adult Health.

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INTRODUCTION

Stroke is a health condition that affects many people in adulthood. In Brazil, stroke has great economic and social impact, and it is the leading cause of death and disability[1]. A nationwide study found an annual incidence of stroke of 108 cases per 100,000 inhabitants, with a mortality rate of 18.5% within the first 30 days and 30.9% in the first 12 months after the episode, besides a recurrence rate of 15.9%[1]. In the case of a recurrent stroke, the risk of death ranges from 23% to 41% within the first 30 days, and the risk of disability ranges from 39% to 53%[2].

Together, systemic arterial hypertension (SAH) and other chronic non-communicable diseases (NCDs), such as diabetes mellitus, heart diseases, and dyslipidemia are considered risk factors for the development of stroke, because they can accelerate the atherosclerosis process. SAH, in turn, is influenced by lifestyle, especially by the presence of overweight and obesity, sedentary lifestyle, smoking, alcoholism, non-adherence to pharmacological treatment, and use of contraceptives. Recognizing and acting on the risk factors for SAH and, consequently, in the prevention of stroke allows designing better strategies to act in the prevention and reduction of mortality and disabilities [3-4].

The Model for Chronic Conditions Care (MACC) proposes three levels of interventions according to the complexity of the chronic condition: A) health promotion for the population, in general, and for simpler health situations; B) health condition management, by providing supported self-care actions for people under established health conditions; and C) case management for complex health conditions such as stroke[5].

Case management refers to the process developed for the individual with a complex health condition, with a view to planning, monitoring, and evaluating his or her health needs. It proposes the involvement of the social support network as a strategy to achieve individual and family autonomy, in addition to increasing quality of life. This care model requires the case manager to show great responsibility, creativity in the face of resources and limitations of the health system[5]. In this perspective, nurses are indicated to assume the role of case manager due to their clinical knowledge, holistic view and characteristic of advocating on behalf of the patient, especially when it comes to people with chronic health conditions[5].

Regarding the use of case management in Brazil, one example is the follow-up of patients with SAH, in which the nurse acted as case manager and obtained as a result a significant reduction in blood pressure levels, body mass index and abdominal circumference over a period of 12 months[6]. In another situation in which case management was also developed with individuals with SAH and conducted by a nurse, besides the reduction in blood pressure, it also showed an increase in treatment compliance and greater care with chronic diseases[7].

Promising results such as those reported in this study point to the need for health professionals, especially nurses, to acquire skills to provide support to patients with chronic diseases through planned and integrated care, with a view to preventing complications and their aggravation[6]. Thus, considering the economic impact of stroke in the health and social areas, and that case management is indicated for complex health conditions, the guiding question of this study was: can nurse-led case management contribute to the maintenance of blood pressure levels within normal parameters, and to the control of other risk factors for new stroke episodes? The research aimed to compare the effect of intervention by nurse-led case management on risk factors and blood pressure in post-stroke persons.

METHOD

This is a quasi-experimental study linked to the research "Nurse-led case management for people with stroke: a mixed methods study", conducted from March 2016 to December 2019, in a South Brazilian municipality. The main feature of the quasi-experimental study is the evaluation of an intervention implemented without randomization, and there may even be no control group. In these cases, data obtained before and after the intervention are compared in the same group[8].

The municipality under study is in the south-central region of the state of Paraná, and has two philanthropic hospitals, characterized as large, which serve patients from the 19 municipalities that make up one of the 22 health regions of the state. For management support, the research relied on the service provided by the Municipal Health Secretariat of the municipality.

The participants were all post-stroke individuals who met the following inclusion criteria: diagnosis of ischemic stroke on admission to hospital services, with or without previous stroke, a maximum score of four on the Rankin scale; having previous arterial hypertension; aged between 18 and 64 years old; and residing in the municipality where the research would be developed. Patients who intended to move during data collection were excluded.

The recruitment of the 14 patients took place through daily contacts during nine months, by telephone or in person, with nurses from the hospital units and/or physicians responsible for the admission of stroke patients in the two hospitals of the city. If they met the inclusion criteria, they were invited to participate in the study. Once accepted, the home visit was scheduled for the first week after hospital discharge, which was communicated to the researcher by the patient's relatives.

The instruments used for recruitment and joint development of the care plan by the nurse case manager and the participant were: Ulbrich and Mantovani Hypertension Complications Prediction Scale (Epchaum)[9], Rankin Scale of Functional Evolution after Stroke[10-11], and National Institutes of Health Stroke Scale (NIHSS)[10,12].

Epchaum was used in the first visit to classify the risk of SAH complications and to direct the care actions to be performed for each participant in the next six months and according to the classification. The number of nursing visits, for example, was defined and adapted according to Epchaum, resulting in three home visits for each participant.

The Rankin Scale evaluates the degree of disability and dependence in case of stroke. The score ranges from zero to six, corresponding to individuals with no symptoms or disabilities and death, respectively[10-11]. For this study, the score up to four was used, which indicates conditions to respond to the established covenants, even presenting some dependence. It was applied when the group to be studied was constituted and in all home visits.

The NIHSS was applied to all three home visits. This scale is composed of 11 items and indicates the size of the lesion and its severity. The total score ranges from zero to 34 and the higher the value, the better the prognosis[11,12].

The intervention consisted of individualized educational actions, operationalized in nursing consultations at home and telephone contacts according to what was proposed by Epchaum. It was carried out by the nurse-case manager, who had a master's degree in nursing with clinical experience in adult medicine in hospital settings and in adult health for undergraduate nursing courses.

The nursing consultations were bimonthly, with an average duration of 40 minutes, which allowed the collection of data regarding the patients' needs. In the first consultation,

vital signs and anthropometric measurements were checked, the three scales were applied, and a semi-structured instrument addressing sociodemographic characteristics, clinical variables, and life habits was applied. This information served as a subsidy for the preparation of an individualized care plan, with the establishment of goals and relevant guidance to the existing doubts

This care plan consisted of referral to other professionals, guidance on treatment adherence, need for physical activity, change in eating habits, among others. It was based on the actions proposed by Epchaum for each risk classification, undergoing the necessary changes for the case presented by the participant. The agreed upon goals were reviewed with the participant in each visit, with the objective of verifying the progress made and/or the need to change them. The activities planned according to the risk classification of complications, as well as the goals agreed upon until the next visit were recorded on individual sheets to allow the evaluation and adaptation to the agreements and the establishment of new goals throughout the follow-up.

For the follow-up on the second and third home visits, the participants had their vital signs and anthropometric measurements checked, and the semi-structured instrument was applied, addressing lifestyle habits and clinical variables and the Rankin Scale, National Institutes of Health Stroke Scale (NIHSS), and the Questionnaire on Adherence to Hypertension Treatment (QATHAS). In turn, telephone contacts were monthly and allowed to clarify possible doubts, adjust the care plan during the interval between home visits, if necessary, reinforce guidelines, and stimulate the bond between the nurse-case manager and the research participant and his family.

The nurse case manager used the Dietary Approaches to Stop Hypertension (DASH)[13] as a basis for providing dietary guidelines to the participants in order to reduce and maintain blood pressure levels within normal values. If needs were perceived regarding the services of other professionals, the case manager contacted the nurse in charge of the reference health unit to schedule appointments in the unit with physicians, nutritionists, physiotherapists, and psychologists, in addition to orientations with the social worker.

The data were double entered and tabulated in Excel® spreadsheet software with Action add-in. Descriptive statistics were used for sociodemographic data, comorbidities, and interventions performed during follow-up. Analysis of Variance (ANOVA) with fixed effects and Fisher's exact test was performed to verify the difference in habits, nutritional aspects, and measurements between the three consultations.

To evaluate the other information, the data were grouped into three subsets: A) Habits - composed of the variables: smoking, alcoholic beverage intake and physical activity practice; B) Nutrition - composed of the variables: sodium, fat, carbohydrates and sugar; C) Measurements - composed of the variables: weight, body mass index (BMI), abdominal circumference, systolic and diastolic blood pressure. The difference between all tests was determined by Fisher's test, being considered significant when it reached $p \leq 0.05$.

The project was approved by the Ethics Committee of the State University of the Midwest - UNICENTRO, under statement 3.002.936 in 2018.

RESULTS

It was verified that most participants were men, n=8 (57.14%), aged between 56 and 65 years, n=nine (64.28%), with incomplete elementary school education, n=8 (57.14%) and monthly income below two minimum wages, n=11 (78.57%). All participants had SAH as it was an inclusion criterion, and the self-reported comorbidities were diabetes mellitus, n=four (30.76%) and some cardiovascular condition, n=five (38.45%).

The actions developed most frequently by the nurse-case manager during follow-up were orientations about dietary changes and adherence to non-drug treatment, in the first and third visits for 14 and 13 participants respectively. In the second visit there were referrals to other health team professionals and to the social worker. On the third visit, besides the actions described, 13 participants were oriented to perform physical activity, and one of them did not need this guidance because he walks every day. When they were referred to other professionals, the participants followed the prescriptions prepared by specialists in nutrition, physiotherapy, and medicine, among others.

Regarding the study variables, below are presented those that obtained significant results among the home visits made by the nurse-case manager, which were supported by the family members who helped them meet the agreed-upon goals (Table 1).

Table 1 - Distribution of clinical variables according to significance levels among home visits. Guarapuava, PR, Brazil, 2019

SUBSET	Variables	p-value between 1st and 2nd visit*	p-value between 1st and 3rd visits*	p-value between 2nd and 3rd visit*
Habits	Smoking	p=0.8958	p=0.0551	p=0.0414
	Ingestion of alcoholic beverages	p=0.6953	p=0.0000	p=0.0000
	Physical activity	p=0.0382	p=0.0382	p=1.0000
Nutrition	Sodium	p=0.0101	p=0.0024	p=0.5919
	Fat	p=0.01	p=0.0027	p=0.6254
	Carbohydrate	p=0.0203	p=0.0203	p=1.0000
	Sugar	p=0.0212	p=0.0111	p=0.791

Source: survey data, 2019.
* Fisher's Test p values (p≤0.05).
Values in bold highlight statistical significance.

The subset variables - measurements - did not show significant differences between home visits, but a reduction in mean blood pressure values was observed, with improvement in both systolic blood pressure (SBP) and diastolic blood pressure (DBP). There was an increase in the number of participants with SAH values within normal parameters throughout the visits (CHART 1).

CHART 1- Blood pressure levels of the participants during follow-up. Guarapuava, PR, Brazil, 2019

Patient	SBP*/ DBP‡ ($mmHg^+$) 1st VISIT	SBP*/ DBP‡ ($mmHg^+$) 2nd VISIT	SBP*/ DBP‡ ($mmHg^+$) 3rd VISIT
1	124/ 72	118/68	100/60
2	110/64	120/78	112/68
3	142/92	160/90	152/94

4	150/92	100/60	140/70
5	10878	128/82	120/80
6	130/90	112/78	120/90
7	102/68	104/70	118/70
8	130/90	130/70	128/68
9	146/94	136/92	130/90
10	160/80	148/80	130/80
11	132/80	120/80	130/80
12	152/80	140/80	130/90
13	190/120	150/100	138/92
14	180/100	170/100	172/110
No. of participants with SBP* < 140 mmHg⁺ and DBP‡ < 90 mmHg⁺	7/5	9/10	11/8

*SBP - systolic blood pressure; ‡DBP - diastolic blood pressure; ⁺mmHg - millimeters of mercury.

DISCUSSION

The sociodemographic characteristics of the participants in this study corroborate those found in a randomized clinical trial conducted in the south region of Brazil for blood pressure control, in which the participants were mostly women, but also with low education and economic status 6. It is possible to observe that, although NCDs affect individuals from all socioeconomic strata, there are groups in which they are more frequent, such as those with low education and income due to the greater vulnerability of health and social conditions.

Regarding the presence and number of comorbidities, most participants reported having some cardiac disorder, followed by those with diabetes mellitus. In this same sense, a study conducted in the United Kingdom investigated the burden of comorbidities in patients diagnosed with Cardiovascular Diseases (acute myocardial infarction, angina, stroke) and detected that the most incident were the cardiometabolic conditions[14].

Among the participants of this research, considering that SAH was an inclusion criterion, the concomitant existence of diabetes mellitus was found in 30.76%. A similar fact was observed in 5,325 individuals treated at an institution for stroke patients from 2010 to 2017, at the University of Kentucky in the United States, in which the most prevalent comorbidities were hypertension, dyslipidemia, smoking, diabetes, obesity and coronary artery disease (CAD)[15]. It is noteworthy that recognizing associated comorbidities contributes to the reduction of cardiovascular events, including stroke, since they may reflect a weakened self-management of health and thus potentiate complications with early onset[6].

During follow-up, the actions developed most frequently by the nurse-case manager were those related to eating habits and adherence to non-drug treatment. A positive evaluation of the nurse's action as case manager in SAH was observed in relation to guidelines for lifestyle changes and adherence to treatment prescriptions[7].

It is necessary to inform about the importance of changing lifestyle, empowering individuals to deal with the new situation through guidelines aimed at a healthy lifestyle in order to favor self-management in the long term. Therefore, orientations about healthy

diet, physical exercise, and reduction in the consumption of alcohol and tobacco should be carried out[16]. These actions are like those performed by the nurse case manager in this research, with emphasis on certain aspects, considering the needs of each one. Moreover, the nurse-case manager also made referrals to other professionals, which highlights the importance of identifying specific demands of each patient, besides the need for cooperative work with nutritionists, physicians, physical therapists, psychologists, and social workers, in order to obtain a more assertive and lasting result[15].

The practice of physical activity was more intensely encouraged by the case manager in the third visit, when improvements in disabilities due to stroke were already presented by many participants according to the Rankin scale and NIHSS results related to dependence and autonomy in the development of daily activities. The nurse must guide the practice of healthier activities during health education, such as encouraging physical activities according to the individual's health condition, motivating the search for positive results[17].

Regarding the change of habits, a significant reduction in smoking was observed between the second and third visit. Smokers are considered to have a higher risk of stroke than nonsmokers. Moreover, every five cigarettes a day increases the risk of developing stroke by 12%; conversely, smoking cessation has a positive effect in reducing the disease[18]. Thus, the case management provided a positive result with the reduction of smoking among the participants and thus reduced the chances of new complications.

The consumption of alcoholic beverages showed a significant reduction between the first and third visit and between the second and third visit. This fact allows evidencing, for these participants, the positive interference of case management in reducing alcohol consumption. There is evidence that consumption >30g/day of alcohol is strongly associated with increased risk for SAH and, consequently, for all types of stroke[13].

Also in the subset habits, the practice of physical activity showed significant results between the first and second visits and between the first and third visits, indicating the beginning of physical activities and their sequence during follow-up by the nurse-case manager. This data shows that the practice of physical activity was oriented and encouraged by the case manager and obtained positive results in relation to the participants. Physical activity in post-stroke people contributes to health reestablishment, functional autonomy, blood pressure reduction, and to the reduction of new stroke episodes[19].

Walking aids muscle, vascular, neural, and skeletal protection, which contributes to the prevention of stroke recurrence[20]. During the follow-up by the case manager, moderate physical activity was recommended, always respecting the participant's limitations, giving preference to aerobic activities for at least 30 minutes a day.

The second subset, referring to nutrition, obtained significant results with reduced consumption of sodium, fat, carbohydrates, and sugar between the first and second visit and between the first and third visit. Although the participants did not make dietary changes when diagnosed with SAH, they did so with the onset of the complication.

Inadequate diet can favor the development of chronic diseases. Sodium contributes to the increase in blood pressure levels and is responsible for about 30% of the hypertension cases, since it favors the process that leads to fat deposits for the formation of atheroma plaque and consequent arterial obstruction. Carbohydrate and sugar propitiate overweight and increased glycemia, factors that are also responsible for cardiovascular disorders[21]. It is considered that the case management contributed to the participants' dietary change, helping maintain blood pressure levels and reducing the possibility of new stroke episodes. The orientations and stimuli given by the nurse contributed to reducing the use of ready-made sodium-rich spices, in addition to the kitchen salt. These individuals started to consume more lean meats, with preparation methods other than frying. Vegetables and fruit also became part of the participants' daily consumption.

The third subset, called measures, did not show significant results in any of the

variables, including blood pressure. A systematic review about the evidence of nurse-led case management demonstrated that, to adequately attend to the interventions, a period of approximately 12 months is necessary, since it can contribute to the self-management of participants with chronic diseases[22].

In the same direction, case management conducted by nurses showed positive results after 12-month follow-up, when significant reduction in blood pressure levels, waist circumference, BMI and improved adherence to treatment in hypertensive adults were obtained6. Although in the present study no significant difference was observed between the measurements obtained in the three consultations, there was a reduction in mean blood pressure values, and the number of participants with systolic and diastolic blood pressure within normal parameters increased over the follow-up, indicating clinical improvement.

In an experimental randomized study with case management for hypertensive patients, it was observed that there were significant differences in the value of blood pressure, adherence to medication and care to control other risk factors for chronic diseases and their complications in a period of 12 months[7]. Thus, it is considered that case management contributed to the self-management of risk factors for hypertension and, consequently, for stroke, which is in line with what was exposed in the present research.

Therefore, it was perceived that the follow-up of the nurse-case manager contributed positively to the control of some risk factors for complications of SAH, such as the occurrence of a new stroke. Nurses have resources to encourage healthier behaviors in the promotion of individuals' health, in order to contribute to self-management of health and thus reflect on the reduction of risk factors for cardiovascular diseases[17].

Possible limitations of this study were the intervention period limited to six months and the data collection only in two hospitals, which resulted in a small number of participants, influencing the measurement of the impact of the intervention.

CONCLUSION

The intervention conducted by nurses in adults in the post-CVA period showed a statistically positive effect in relation to increased physical activity, adoption of a healthier diet, with reduced sodium, fat, carbohydrates and sugar, and a non-significant reduction in blood pressure levels. Moreover, this study contributes to professional practice, demonstrating that the effective role of nurses in promoting people's health by monitoring complex health situations can add to the existing factors to give greater visibility to their role in people's health.

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Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work - Souza PB de, Mantovani M de F; Drafting the work or revising it critically for important intellectual content - Souza PB de, Mantovani M de F, Peres AM, Marcon SS, Madureira AB; Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved - Souza PB de, Mantovani M de F. All authors approved the final version of the text.

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