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Physical Exercise in Neck Pain and Emotional Well-Being in Caregiver Burnout

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Abstract

Most of the family members of people with Cerebral Palsy (CP) are those who func-tion as informal caregivers. On certain occasions, their work affects their quality of life and their health, and can trigger lumbar and cervical pain. Studies carried out in several countries show that they are a highly vulnerable population, with poor coping strategies that favor their adaptive process. The present study aims to determine the effects of physical exercise on neck pain present in caregivers of people with CP. It is a quasi-experimental quantitative research, with a pretest-post-test design with a control group, with a non-probabilistic sample due to accessibility considering the characteristics of the participants for the study.

The research carried out the analysis of the functional effects on the cervical and emotional spine of the implementation of a physical exercise program in caregivers of people with CP. The intervention with a physical exercise program for 16 weeks in an experimental group of 100 informal CP caregivers for 19.83 ± 1.2 years improved caregiver burden, emotional health and neck pain. In contrast, the control group after 16 weeks worsened anxiety.

The results of the present study collaborate as a non-pharmaceutical treatment for anxiety and neck pain, being the practice of physical exercise for 16 weeks a good option to alleviate the symptoms of Caregiver Overload Syndrome.

Keywords: *caregivers, cerebral palsy, physical exercise.*

1. Introduction

Cerebral Palsy (CP) is a physical disability that causes alterations in mobility and development, as well as others in sensation, perception, cognition, communication and behavior. (1)

The family of subjects with CP tries to improve the quality of life of the people in their care, since there is a correlation between the degree of motor impairment and the decrease in quality of life in the pediatric and adolescent population with CP.

In addition to the quality of life of people with CP, the quality of life of their caregivers is also affected. Caregivers of a family member with CP often have health problems

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associated with this work. Among the main diseases are: stress, headache, sleep disturbances, anxiety and neck pain. (2)(3)

There is evidence that the use of supervised aerobic exercise, performed three times a week at moderate intensity for a minimum of eight weeks, has become an alternative treatment to medication in the management of depression and spinal pain. (4–6)

Exercise increases blood flow, vascular density, during exercise the nervous system increases the levels of neurotransmitters such as: endorphins, noradrenaline, serotonin reducing anxiety, pain and improving mood and sense of well-being. (7,8)

These benefits can also be seen reflected in caregivers of people with chronic neurological diseases, in different studies on the practice of physical exercise they have presented positive effects mainly in reducing the burden of the caregiver. (9,10)

The physical and emotional health of the caregiver is important, and currently there is little scientific evidence on treatments, prevention and promotion measures that help improve the quality of life of this group of people, this was the main motivation for carrying out this research and therefore the objective of this study.

2. Methods

2.1 Design

The present study is a quasi-experimental quantitative study, with a pretest-post-test design with a control group, with a non-probabilistic sampling for accessibility considering the characteristics of the participants for the study.

In the research, the physiological and emotional effects of the implementation of a physical exercise program in caregivers of people with CP were analyzed.

2.2 Participants

A total of 200 women with a mean age of 48.25 ± 1.29 years, caregivers of a family member with CP, who presented Caregiver Overload Syndrome, participated in the study. The sample was divided into two groups: a so-called intervention group, which followed a 16-week exercise program with a frequency of 3 times a week, and a control group whose participants continued their usual lives.

The inclusion criteria were: being a caregiver of a family member with CP, for a period between 18 and 25 years, with Caregiver Overload Syndrome, assessed with a score higher than 46 in the Zarit test, who did not have health problems that prevented them from practicing physical activity and who agreed to participate freely and voluntarily in the research. The exclusion criteria were being a caregiver for a family member with another dependent disease, having cardiovascular risk and/or pre-existing heart disease.

2.3 Procedure

The following variables were investigated: family functionality with the APGAR test, caregiver burden with the Zarit test, emotional well-being with the GHQ 28 questionnaire and neck pain with the Oswestry test.

The physical exercise program was applied and supervised by a physiotherapy professional for a period of 16 weeks, 3 days a week (with a rest day), for 60 minutes, the exercises were performed in a group manner. In the first weeks of the physical exercise program, it started with a low intensity and was progressively increased until reaching week 16 at a moderate intensity.

2.4 Statistical analysis

Data is shown as mean ± standard deviation. The normality of the variables was checked with the SHAPIRO-WILK test. To analyze the influence of the intervention program on

the study variables, a two-factor ANOVA (pre-post group) was performed. The level of significance was set at p <0.05 in all cases. All calculations were performed with SPSS version 22.

2.5 Ethical considerations

All families received information about the objectives and characteristics of the study and gave verbal and written informed consent from the participant. This work was designed following the deontological standards recognized by the Declaration of Helsinki, complying with the recommendations of the Good Clinical Practice of the Ecuadorian Ministry of Public Health and the current Ecuadorian regulations that regulate research on human beings, and received a positive assessment from the Ethics Committee.

3. Results

Table 1. Characteristics of caregivers

		Total sample (n = 200)	GE (N=100)	GA (N=100)	Intergroup difference P
Age (years)		48.25 ± 1.29	47.98 ± 1.21	48.50 ± 1.38	0,35
Years of Care		20.13 ± 1.53	19.83 ± 1.21	20.42 ± 1.77	0,24
Family Functionality		15 ± 2.32	16.5 ± 1.78	13.5 ± 1.78	0,00*
Emotional Well-Being	Somatic symptoms	5.66 ± 0.63	5.83 ± 0.71	5.5 ± 0.52	0,20
	Anxiety	6 ± 0.65	6.25 ± 0.62	5.75 ± 0.62	0,06
	Social dysfunction	6.25 ± 0.53	6.33 ± 0.49	6.16 ± 0.57	0,45
	Depression	5.66 ± 0.86	5.91 ± 0.66	5.41 ± 0.99	0,16
Caregiver Burden (CU)		63.12 ± 4.09	61.6 ± 3.11	64.58 ± 4.56	0,08
Cervical Functionality		55.61 ± 2.23	58.79 ± 2.22	56.83 ± 3.08	0,31

Note: Results expressed as mean ± standard deviation.

GE= Experimental Group; CG= Control Group; P = statistical significance

*indicates statistically significant intergroup difference with a significance level of P <0.05

The sample was divided into two groups, a group where the intervention was performed, made up of 100 women aged 47.98 ± 1.21 years, caregivers of patients with CP with a mean of 19.83 ± 1.21 years of care; and a control group, made up of 100 women with characteristics similar to the intervention group in age and years of care (P=0.35; P=0.24). The 2 groups presented mild family dysfunction (13-16 points) with a mean of 15 ± 2.32

points, being lower in the control group compared to the intervention group (13.5 ± 1.78 points vs. 16.5 ± 1.78 points respectively; P< 0.05).

In the assessment of emotional well-being in the first data collection, both groups presented somatic symptoms, anxiety, social dysfunction and depression without intergroup statistical differences (P>0.05). Regarding the intensity of the caregiver's burden, the two groups presented an intense load with a mean of 63.12 ± 4.09 points, presenting intergroup homogeneity (P=0.08).

In the assessment of cervical function in the first data collection, both groups presented severe cervical pain, , with no intergroup statistical differences (P>0.05).

Table 2. Characteristics of People with Cerebral Palsy

		Total sample (n = 200)	GE (N=100)	GA (N=100)	Intergroup Difference P
Age		20.13 ± 1.53 [A]	19.83 ± 1.2 [A]	20.42 ± 1.77 [to]	0,24
Gender	Female	37.50%[b]	16.70% [b]	20.80% [b]	
	Male	62.50% [b]	33.30% [b]	29.20% [b]	
Total		100% [b]	50% [b]	50% [b]	
Degree of dependency		37.5 ± 10.52 [A]	39.16± 11.04A	35.83 ± 10.18 [A]	0,45

Note: [a] Results expressed as mean ± standard deviation.

[b] Results expressed as percentages

GE= Experimental Group; CG= Control Group; P = statistical significance

*indicates statistically significant intergroup difference with a significance level of P <0.05

Regarding the characteristics of the people with CP who are cared for by the study participants, the male gender predominates with 62.50% of the group of people with CP in the care of the study sample, on the other hand, 37.50% are women.

The average age was 20.13 ± 1.53 years and the degree of dependency between people is moderate with an average value of 37.5 ± 10.52 score on the Barthel test, presenting intergroup homogeneity (P>0.05).

Table 3. Caregiver burden, emotional well-being and neck pain before and after intervention

		GE (N=100)	Intragroup Difference P	GA (N=100)	Intragroup Difference P	Intergroup Difference P
Caregiver Burden	pre	61.6 ± 3.11	0,00*	64.58 ± 4.56	0,08	0,00*
	post	53.6 ± 3.72		65.25 ± 4.15		

Somatic symptoms	pre	5.83 ± 0.71	0,00*	5.5 ± 0.52	0,08	0,015*
	post	4.9 ± 0.79		5.75 ± 0.75		
Anxiety	pre	6.25 ± 0.62	0,00*	5.75 ± 0.62	0,01*	0,00*
	post	4 ± 0.6		6.16 ± 0.83		
Social dysfunction	pre	6.33 ± 0.49	0,00*	6.16 ± 0.57	0,03*	0,00*
	post	5.08 ± 0.66		6.5 ± 0.67		
Depression	pre	5.91 ± 0.66	0,00*	5.41 ± 0.99	0,08	0,012*
	post	4.08 ± 0.79		5.16 ± 1.11		
Cervicalgia	pre	58.79 ± 2.22	0,00*	56.83 ± 3.08	0,08	0,012*
	post	44.08 ± 1.79		57.16 ± 2.41		

Note: GE= Experimental Group; CG= Control Group; P = statistical significance. *Indicates statistically significant intragroup difference with a significance level of P<0.05

The post-intervention data in the two groups vary intergroup, in the intervention group the variables of caregiver burden and emotional well-being decreased in a statistically significant way (P<0.05), on the contrary, in the control group these variables increased.

The caregivers' burden in the Zarit test was significantly reduced in the group that followed the P<0.05 exercise program. On the other hand, in the control group there was no statistically significant change (P=0.08).

When analyzing emotional well-being, the subscales that showed the greatest reduction after the intervention with the physical activity program were anxiety and depression (P<0.05), while the control group had a statistically significant increase in anxiety (P=0.01) and social dysfunction (P=0.03).

The experimental group reduced neck pain after the intervention with physical exercise (P=0.01) in contrast to the control group, which did not present any statistically significant changes (P=0.08).

4. Discussion

The physical exercise program applied in the Caregiver Overload Syndrome produced positive effects in the reduction of caregiver burden, somatic symptoms, anxiety, social dysfunction and depression in the intervention group, which unlike the control group, at the end of 16 weeks increased anxiety and social dysfunction.

The literature mentions that practicing physical exercise in a group way expands and improves social interaction, due to the development of social, communicative and coexistence skills and abilities through body expression, cooperation and inclusion. In addition, physical exercise improves people's self-esteem, confidence, commitment, effort

and vitality by feeling better about themselves, which favors interpersonal relationships. (11–15)(16–18)

The results of this research are consistent with studies carried out in caregivers of people with chronic diseases, that the practice of physical exercise causes a positive anxiolytic effect and the reduction of symptoms of depression and anxiety. Physical exercise improves the regulation of the cardiovascular and respiratory system by affecting the nervous system, which increases the levels of neurotransmitters such as: endorphins, noradrenaline, serotonin, reducing anxiety, pain and improving mood and the feeling of well-being. (19,20)(21,22)

The results of the present study collaborate as a non-pharmaceutical treatment for anxiety and neck pain, with the practice of physical exercise for 16 weeks being a good option to alleviate the symptoms of Caregiver Overload Syndrome.

5. Conclusions

Caregivers of people with chronic diseases, such as CP, often present exhaustion, physical and psychological exhaustion due to intense dedication to care. This situation causes a series of physical, psychological, and emotional symptoms.

All of the above-mentioned symptomatology treated with the intervention of a physical exercise program for 16 weeks in an experimental group of 100 informal CP caregivers improved caregiver burden, emotional health, and cervical functionality. Conversely, the control group after 16 weeks worsened emotional health in aspects of anxiety and social dysfunction.

Physical exercise improved physical and emotional health, due to the development of social and communicative skills and abilities through body expression, also the positive effects of physical exercise were regulating the nervous system, increasing the release of neurotransmitters improving mood and sense of well-being.

This study is of great contribution for the treatment of neck pain and anxiety with physical exercise for 16 weeks.

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