

***Results of cognitive stimulation integrated with physical rehabilitation in
a patient with hemiplegic syndrome***

***Resultados de la estimulación cognitiva integrada con rehabilitación
física en paciente con síndrome hemipléjico***

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ABSTRACT

Cerebrovascular diseases are one of the leading causes of morbidity and mortality worldwide, which cause physical-motor and cognitive limitations in the individual. This article aims to evaluate the results of the application of a system of cognitive actions integrated with physical rehabilitation in hemiplegic patients. The most used methods were observation, analysis-synthesis and statistical-mathematical. Among the results to be achieved, the improvement in memory domains stands out, as well as attention and global cognition with significant effects.

Keywords

Cognitive stimulation; Physical rehabilitation; Hemiplegic syndrome; Physical-motor limitations

RESUMEN

Las enfermedades cerebrovasculares constituyen unas de las primeras causas de morbilidad y mortalidad a nivel mundial, que originan en el individuo limitaciones físico-motoras y cognitivas. El presente artículo, tiene como objetivo evaluar los resultados de la aplicación de un sistema de acciones cognitivas integradas con la rehabilitación física en el paciente hemipléjico. Los métodos más utilizados fueron, la observación, análisis-síntesis y estadísticos-matemáticos. Entre los resultados a alcanzar destacan, la mejoría en los dominios de memoria, al igual que, la atención y la cognición global con efectos significativos.

Palabras clave

Estimulación cognitiva; Rehabilitación física; Síndrome hemipléjico; Limitaciones físico-motoras

INTRODUCCION

Cerebrovascular diseases (CVD) constitute a public health problem worldwide and in the Bolivarian Republic of Venezuela it represents the third cause of morbidity and mortality. (Marcano, 2018). Cerebrovascular disease is defined by several authors as the temporary or permanent involvement of an area of the brain due to ischemia or hemorrhage, with the involvement of one or more cerebral blood vessels by a pathological process or in the quality or quantity of the blood that circulates. these contribute. (González & Andínez, 2016)

Among the manifestations of cerebrovascular diseases is the hemiplegic syndrome, which causes a high degree of disability, due to the lesions that occur in the central nervous system (CNS), (Barroyeta, 2018). Hemiplegia, is the paralysis of one hemibody, and is accompanied by different symptoms such as: paralysis, speech disorders, urinary incontinence, dysphagia, emotional and cognitive disorder deficits. In accordance with (Lucas et al., 2020) it is estimated that up to 80% of patients who have had a stroke experience one or more cognitive symptoms at some point in the course of the disease.

Cognitive function is the result of the global function of all your intellectual areas, thinking, memory, perception, communication, orientation, calculation, understanding and problem solving, and its condition can lead to loss autonomy and personal identity.

In this sense, the cognitive sequelae inherent to the hemiplegic syndrome are manifested in alterations in visuo-spatial perception, topographical disorientation, reasoning, attention, learning, judgment, and memory problems. Similarly, it is suggested that in hemiplegic syndrome disorders in attention, memory and processing speed (cognitive triad) are more frequently manifested; and that they must be treated as a priority for the rehabilitation to be successful. (Lucas et al., 2020; Rodríguez & Urzúa, 2009).

World Health Organization (OMS, 2010) has issued indications for the prevention and treatment of cerebrovascular diseases, which are aimed at minimizing the negative impact it causes for the individual and society. Accordingly, the prevention of risk factors such as obesity, avoiding bad eating, sedentary lifestyle, among others, is used. Likewise, patients who have suffered a cerebrovascular event are instructed to have early care and join comprehensive rehabilitation programs, where different neurological rehabilitation techniques are prescribed.

To mitigate the negative effects caused by the hemiplegic syndrome, there are different rehabilitation programs at the hospital level, and polyclinics that include treatments such as: occupational therapy, cognitive rehabilitation, physical rehabilitation. In this last

process, physical exercise occupies a leading place in the rehabilitation of patients with hemiplegic syndrome, since it greatly contributes to reducing symptoms in patients and to the rapid restoration of health and social integration.

Consequently, and given the need to care for patients with acute and chronic sequelae of cerebrovascular disease in the community, Physical Rehabilitation Programs have been designed in Venezuela for community care in “Barrio Adentro” for hemiplegic patients, based on the Cuban experience. These programs are predominantly based on the medical-biological model that warns of comprehensive intervention strategies with multidisciplinary participation and its general objective is to improve the patient's self-validity. In addition, it consists of three stages a) Basic physical preparation stage, b) Stage for the Consolidation of motor responses and c) Stage of Improvement. This last stage; it is where patients begin to acquire more independence according to their limitations: physical and functional.

In relation to the studies carried out, (Coll et al., 2011) developed a rehabilitation program in patients with hemiplegic syndrome with two groups, one control and one experimental, and applied assisted active exercises, physical exercises of balance, coordination, strength, among others, and concluded that the sample that received the program improved all the indicators evaluated, with results superior to those of the group. control. For its part, (Martínez-Quevedo & Hernández-Silva, 2012) used an alternative of physical exercises for the rehabilitation of elderly patients with hemiplegia and the results showed significant changes in the lifestyle of the sample, as well as in their functional independence. Similar findings reached (Castro, 2014; Delgado, 2015) with the application of exercises to improve gait in hemiplegic patients.

Equally, (Ramírez & Semanat, 2018) used a battery of physical exercises for the rehabilitation of the upper limbs and found that the sample improved their functionality and independence. Equivalent results were achieved by (Nuñez, 2020) with the intervention of the Bobath method in hemiplegic patients.

In the inquiries referred of physical rehabilitation to the patient with hemiplegic syndrome who is in the Improvement Stage, significant results are revealed in the improvement of physical functional capacity, however, the results declared in attention to cognitive function are insufficient. Consequently, the objective of the work is aimed at evaluating the results of the application of a system of cognitive actions integrated with physical rehabilitation in a hemiplegic patient from the Mapora Community in the municipality of San Carlos, Cojedes State, Venezuela.

METHODS

A case study was carried out, of an experimental type and with a pre-test and post-test level, in the period from September 2020 to January 2021 in the La Mapora Community of the San Carlos municipality in the Cojedes State, Venezuela.

The intentionally selected sample, a 61-year-old male patient with a diagnosis of stroke and spastic left hemiplegia as a sequel, with impaired coordination, balance, gait and alterations in the process of short-term memory, working memory and memory. attention. The patient was in the Improvement Stage, according to (Coll et al., 2011).

Inclusion criteria: patients who are in the chronic phase (Spastic) and with cognitive sequelae.

Exclusion criteria: patients who do not meet the inclusion criteria.

An inquiry was made related to the development of the phenomenon to be investigated chronologically. Study of existing methods over time, fundamentally those related to the rehabilitation of spastic hemiplegic patients in cognitive physical integration.

Then, an analysis of the phenomenon under study was carried out, which allowed its decomposition and to issue condensed judgments of the appreciation of authors who have investigated the subject under study. An observation was made to know the particularities of the evolution of the patients during the rehabilitation period with the integration of cognitive stimulation.

A survey was applied to the specialists who participate in the case study of rehabilitation of the patient with hemiplegic syndrome to know the aspects of cognitive rehabilitation. For the measurement, the serial Luria test cited by (Barrientos, 2021). It consists of the memory of words, auditory verbal. The ten words are read three times and, once they have been grasped, the examinee must repeat the words they remember, aloud after one hour, the examinee is asked to pronounce the words they remember.

The Sub-Digits of the Wechsler III Intelligence Scale. The test is composed of two parts: forward and reverse digit repetition, both consisting of pairs of digit strings, which increase in length with the progression of the test. Also, the Minimental test that assesses the patient's global cognition was evaluated.

Percentage calculation and average values and the T students for paired samples were used in the statistical techniques. The mathematician the percentage calculation. Levels of 0.10; 0.05 and 0.01 indicating the degrees of significance: little significant, significant and very significant, respectively. The SPSS 20.0.0 Software of 2011 was used.

Cognitive actions integrated with physical rehabilitation were applied according to (Barrientos, 2021) who conceptualizes as "the different actions and tasks of a cognitive nature, elaborated from the contents of different sciences, which are combined with physical exercise to simultaneously stimulate cognition".

Cognitive actions

The cognitive actions were combined with the rehabilitation exercises of the third phase of improvement of the hemiplegic patient; taking into account the objectives proposed at this stage by (Coll et al., 2011).

Stage Objectives

- Continue the work of the previous stage.
- Perfect balance and coordination work.
- Improve muscle strength and tone

The exercises that were applied in this phase were performed in:

- exercises on a mattress, on trellises, parallel bars, free exercises, strength and breathing exercises.

Table No.1. System of cognitive actions integrated with physical rehabilitation for cognitive stimulation in patients with hemiplegic syndrome.

Objectives	Cognitive actions integrated with physical rehabilitation
-Stimulate spatial orientation. -Improve joint mobility decrease spasticity.	Execute assisted exercises and at the same time ask the patient the day of the month. -Explain direction of movement executed.
-Improve short-term memory, aerobic endurance and gait coordination.	As you go, repeat three words dictated by the teacher.
-Stimulate language and verbal fluency -Improve aerobic endurance and gait coordination.	Riding on the bike produce words with letter C. -Produce a sentence with a word presented by the teacher.

Source: Barrientos (2021)

RESULTS

The evaluation of the cognitive capacity, in the variable corresponding to the verbal auditory processing of short-term memory, was carried out by means of the Luria Serial Test, as can be seen in Table No. 2. , the patient in the pretest managed to evoke in five attempts, an average of four words out of ten, which represented 40%. However, when receiving integrated rehabilitation with the cognitive actions system, it optimizes the number of words evoked in the post-test with three more words, for a total of seven, which

represents 70%. Similar results reached (Barrientos, 2013) in a sample diagnosed with high blood pressure and osteoarthritis.

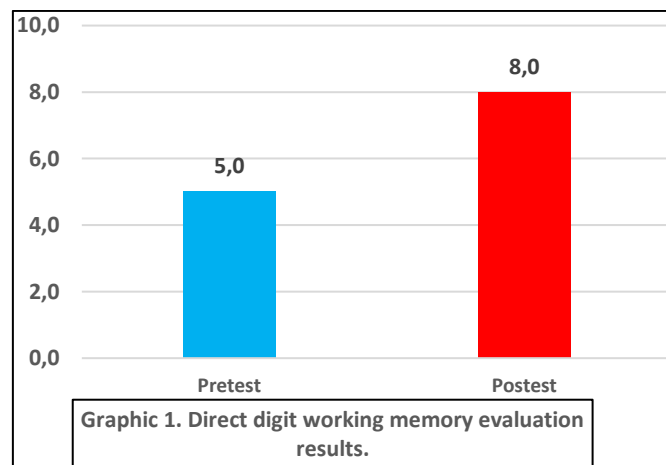
Table No. 2. Results of the serial Luria test

Evaluations	Pretest Control	Experimental post-test	Difference	Next.
Total of words evoked	4	7	3	***

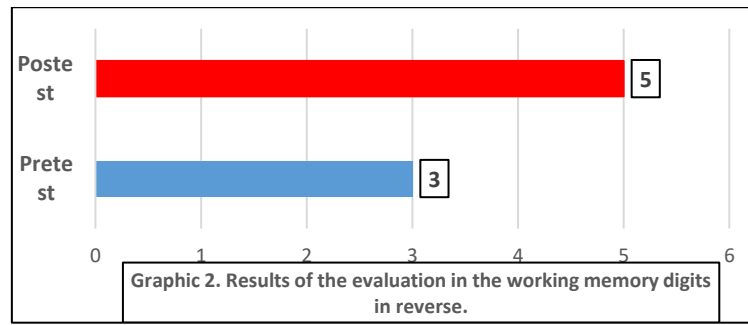
Source: self made

The first graphic shows the behavior of the direct digits and it can be seen how the evaluated sample improves the number of evoked digits from one measurement to the other, since it manages to remember five digits in the pretest and eight in the posttest, for a 62.5% with a difference of three words. These results are very significant, since the sample improves attention and the memory process, cognitive indicators that intervene in the information processing process.

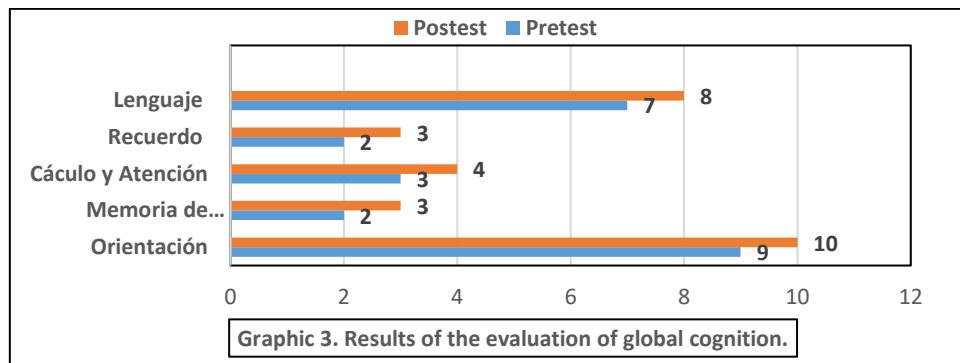
Graphic No. 1. Behavior of direct digits



Similar results were reached by the sample evaluated in the reverse digits, as revealed in Graph 2; in the pretest he was able to evoke three digits and in the posts five digits for 60%. The data obtained by the sample are considered very significant, because the working memory has a close relationship with the manipulation of information, it is the “mental space” of work, necessary for episodic and semantic memory, for thought and decision making, for the understanding of language and mental calculation, and in general for all cognitive activities that require attention and controlled processing.

Graphic No. 2. Results of the evaluation in the reverse digits

The sample was evaluated with the Minimental test, which evaluates global cognition, and it can be seen in Graph 3, that it reached low scores in the pretest in: fixation memory, attention and calculation. However, in the post-test it improved in the evaluated domains and in global cognition.

Graphic No. 3. Results of the Minimental test**DISCUSSION**

The results obtained by the sample in global cognition with physical rehabilitation integrated with cognitive actions are very significant. Consequently, the research is considered novel and exploratory because there is insufficient research that is projected with this intention from the context of physical rehabilitation for the care of hemiplegic syndrome. Hence, the authors' results are assumed as support. (Santos, 2006; Barroyeta & coll., 2018) who have investigated cognitive processes in the context of psychology and neuropsychology, and their findings reveal that cognitive stimulation is an effective method to improve cognition in the samples studied. Similarly, research supports the stimulation of cognitive processes in older adults combined with physical exercises of (Barrientos, 2021; Reigal & Hernández, 2014).

The effects obtained in the cognitive processes in the evaluated sample are based on the neuroplasticity that facilitates the regeneration of new synaptic connections according to (Valdes, 2017). In the same way, these cognitive actions for their application fulfill the pedagogical principle of the simple to the complex and from the easy to the difficult. and

the improvement phase is used in a timely manner where the isolated components are exempted at the time of executing the exercises, since there is a certain level of mastery in their execution by the patient, which facilitates the execution of two tasks at the same time.

At present, the rehabilitation of the patient with hemiplegic syndrome in Physical Culture is only applied to the patient with physical exercises, and the results are about the improvement of functional capacity. That is why the results obtained in the cognitive evaluation of the patient are significant and reveal the need to prescribe physical exercises integrated with cognitive stimulation to provide attention to the cognition of the patient with hemiplegic syndrome.

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