Signatory of DORA
https://doi.org/10.56183/iberojhr.v4is.696
Ibero-American Journal of Health Science Research
OPEN ACCESS
BY-NC-ND
Received: 21/08/2024
Accepted: 05/12/2024
Published: 09/12/2024

Motor reeducation to improve activities of daily living in older adults

Reeducación motriz para mejorar las actividades de la vida diaria en adultos mayores

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ABSTRACT

Background: Postural control disorders have a high correlation with sensory and cognitive aspects in the elderly. It is reflected in the execution of activities of daily living. In this way, the interest arises to re-educate the upper and lower limb in older adults to improve the execution of activities of daily living through motor control exercises. **Method**: The research was of a descriptive type of longitudinal cohort, under a quantitative approach on 30 older men and women who met the inclusion and exclusion criteria of the "Mi Viejo Guaytacama" Care Unit. The Barthel index was applied to evaluate the activities of daily living and the level of independence of the elderly. The initial evaluation and review of the scientific evidence allowed the design of a protocol that was reviewed and validated by three experts, to be applied for 16 weeks, twice a week and with duration of between 25 to 45 min per session. **Results**: The results after the application of the physiotherapeutic intervention reflect an improvement in the execution of the activities of daily living, going from severe and moderate levels of dependence to independence in all activities. In addition, significant differences were obtained between the measures ($p<0.000$). **Conclusion**: The motor re-education of the lower and upper limb improves the execution of activities of daily living and the level of independence of the elderly.

Keywords: postural balance; muscular strength; daily activities; fragile elderly.

RESUMEN

Antecedentes: Los trastornos del control postural tienen una alta correlación con aspectos sensoriales y cognitivos en los ancianos. Se refleja en la ejecución de las actividades de la vida diaria. De esta manera, surge el interés de reeducar el miembro superior e inferior en adultos mayores para mejorar la ejecución de las actividades de la vida diaria a través de ejercicios de control motor. **Método**: La investigación fue de tipo descriptiva de cohorte longitudinal, bajo un enfoque cuantitativo en 30 adultos mayores hombres y mujeres que cumplieron con los criterios de inclusión y exclusión de la Unidad Asistencial «Mi Viejo Guaytacama». Se aplicó el índice de Barthel para evaluar las actividades de la vida diaria y el nivel de independencia de los adultos mayores. La evaluación inicial y revisión de la evidencia científica permitió diseñar un protocolo que fue revisado y validado por tres expertos, para ser aplicado durante 16 semanas, dos veces por semana y con una duración de entre 25 a 45 min por sesión. **Resultados**: Los resultados tras la aplicación de la intervención fisioterapéutica reflejan una mejoría en la ejecución de las actividades de la vida diaria, pasando de niveles de dependencia severa y moderada a independencia en todas las actividades. Además, se obtuvieron diferencias significativas entre las medidas ($p<0,000$). **Conclusiones**: La reeducación motora del miembro inferior y superior mejora la ejecución de las actividades de la vida diaria y el nivel de independencia de los ancianos.

Palabras clave: equilibrio postural; fuerza muscular; actividades cotidianas; ancianos frágiles.

INTRODUCTION

Aging corresponds to a normal physiological process, which is accompanied by the gradual decline of individual physical and mental capacities in each older adult (OA), understanding that its connection with age is relative. In this way, there are older adults with excellent health while others are very affected and become dependent on another person, losing their total autonomy (World Health Organization 2018; Landinez, et al., 2012).

In Ecuador, the number of older adults (OA) increases every year. According to statistics from the Ministry of Economic and Social Inclusion, there are 1,049,824 OA in the country. That is, 6.5% of the total population. By the end of each year this figure will increase significantly, since OA are considered from the age of 65 (Ministry of Economic and Social Inclusion 2022).

In the Province of Cotopaxi there are 31,934 OA according to the last census carried out. The majority of elderly people are found in urban areas. There is a higher incidence in females than in males. The average life age range is 75 to 80 years, but people have been known to live longer than 100 years. This is due to the nutrition and care they take throughout their lives. (National Institute of Statistics and Censuses 2010).

Exercise is a healthy activity that, if practiced regularly, prevents health problems and improves people's quality of life. An active older adult will have better aging than a sedentary person. Therefore, a specific dosed and directed exercise improves overall health, preventing diseases, physical or psychological injuries that appear with age. In this way, the application of a motor reeducation exercise guide will contribute to the reduction of risk factors for morbidities, limitations, disabilities and loss of autonomy (Caballero, et al., 2018; Kirker, et al., 2000; Font, et al., 2020; Restrepo et al., 2006). For this reason, the objective of this research was to reeducate the upper and lower limb in older adults to improve the execution of activities of daily living.

The stage of old age is a long period of time that most people will go through. It can be carried out in a healthy way, with a good quality of life through the practice of physical activity. It aims to determine the effectiveness of a physical activity program to improve the strength of the lower limbs and balance of the elderly. It is concluded that physical activity is effective in improving balance and muscle strength of the lower limbs. The conclusion was that, it should be used as a tool to preserve or improve the functionality and autonomy of older adults (Chalapud, et al., 2017; Soliz, et al., 2015; Loredo, et al., 2016).

Little physical activity is one of the components of frailty, considering interventions to prevent or reverse this syndrome. A review of controlled studies was conducted where exercise-based interventions were applied to control frailty in older people. The results reflected that the majority of exercise interventions cause improvements in the frequency of falls, mobility, balance performance, functional capacity, muscle strength, body condition, and frailty. Although, there is a difference in the effects of some versus to others (De Labra, et al., 2015; Geurts, et al., 2005; Esain, et al., 2021).

In the research of Vasconcelos, et al., (2016), a study of the relationship between muscle strength and the ability to perform basic and instrumental activities of daily living in an elderly rural population of Jackie, Brazil was carried out. The results showed a significant correlation between muscle strength and the dynamic ability to perform activities of daily living. Conclusions: Reduced muscle strength is an important predictor of functional capacity in older adults. Therefore, it is recommended to observe muscle strength in exercises designed for older adults.

Bayona, et al., (2012) also carried out a cross-sectional descriptive study carried out on a total of 280 institutionalized elderly people, all of them in private residences in the city of Soria. Given the characteristics of the study, those with a total or severe degree of dependence (Barthel index < 40) or moderate or severe cognitive impairment (Pfeiffer test *5) did not participate, as they could incorrectly interpret the content of the study. Questionnaires and the data obtained could be unreliable. To measure dependence on basic activities of daily living (BADL), following the recommendations proposed by various researchers, the Barthel index was chosen. Its objective is to evaluate the functional capacities of the elderly, taking into account their physical and instrumental autonomy in the BADL.

METHODOLOGY

The research was developed under a descriptive, quantitative, and cross-sectional approach. The Barthel Scale (Activities of Daily Living) was used, which has a validity and reliability of 94.3% (Martínez, 2009).

The research project was developed in the "Mi Viejo Guaytacama" Care Unit belonging to the home visits project agreement between the Rural Parochial Decentralized Autonomous Government of Guaytacama (GADPR Guaytacama) and the Ministry of Economic and Social Inclusion (MIES), belonging to the Guaytacama parish, province of Cotopaxi, Zone 3 of

the MIES of Ecuador. This care unit has a total of 40 users who participated in this project, women and men between 65 and 90 years old, who reside in the Pilacoto neighborhood of the parish. The users' homes have an easily accessible and comfortable space to perform the exercises easily, avoiding any type of risk that could threaten their physical integrity.

The project was developed with 30 older adults from the "Mi Viejo Guaytacama" care unit of the Guaytacama parish belonging to the GADPR Guaytacama – MIES home visit project. The age range was of 65 to 90 years old of both sexes, who were selected according to the inclusion criteria such as not having suffered any type of injury, complete functional mobility and the exclusion criteria which were severe hearing loss, recent surgeries (3 months), dementia and wheelchair.

To collect information, a review of information articles was carried out to determine motor re-education exercises for the upper and lower limbs and thus improve the execution of activities of daily living. A data collection form was presented to the participants to determine the inclusion and exclusion criteria. This work is approved by the Human Research Ethics Committee of the Faculty of Health Sciences – UTA, dated 10-28-2023, and whith an assigned code 033-CEISH-UTA-2023.

The Barthel index (BI) was applied, which is an instrument that measures a person's ability to perform ten activities of daily living (ADL), which are considered basic. A quantitative estimate of their degree of independence was obtained, in its version original. Being 0-20 Total dependence; 21-50 Severe dependence; 61-90 Moderate dependence; 91-99 Low dependence; 100 Independence; 90 Independent with the use of a wheelchair. The BI is defined as: "Generic measure that assesses the patient's level of independence with respect to carrying out some activities of daily living (ADL), through which different scores and weights are assigned according to the ability of the examined subject to carry out these activities. The values assigned to each activity are based on the time and amount of physical assistance required if the patient is unable to perform said activity. Full credit is not given for an activity if the patient requires minimal assistance and/or supervision, for example, if they cannot safely perform the activity without someone present (Cid-Ruzafa,1997; Guirao et al., 2009). It has a validity and reliability of 94.3% (Martínez, 2009).

After having carried out the intervention, it was evident that, in the first evaluation, 6 older adults were found within the range of severe dependency, and 24 people in low dependency.

The exercise program was designed based on an initial evaluation of the population. The Barthel index was applied to evaluate the activities of daily living at the beginning of the protocol execution and at the end to verify the application of the exercises. The exercise program was applied to the population (duration: 16 weeks, frequency: 2 to 3 times per week, session duration of 25 to 45 min. The protocol for its application was reviewed by experts and validated by calculating the coefficient of CVC content validation.

Once the exercise protocol was finished, a reevaluation of the population was carried out with the application of the Barthel scale where the older adults were found within the range of Low dependence to 1 person, in Moderate dependence to 1 person and in Independence to 38 people.

Activities of daily living in older adults (Moreira, et al., 2018, Rodríguez, 2009; Osoba et al., 2019)**.**

Motor reeducation is that phase of exercise dedicated to developing or recovering voluntary muscle dominance. Teach a muscle that has lost its function due to injury, disuse, atrophy or pathology, to recover it. Where its primary objective is functionality without tiring quickly; allowing them to carry out activities of daily living that are useful to them. They must be based on these principles:

Activation, the focus of this phase was to guide the patient on the desired movement. It allows passive movement to be used to give awareness to the patient through sensory and visual perception. To do this, it was essential to take into account different aspects when performing the movement:

Direction of movement.

Mobility arc.

The movements must be performed rhythmically and slowly for better learning and are mobilizations of:

Shoulder, Elbow, Wrist and Hand.

Hip, Knee, Ankle and Foot.

Strengthening, strengthening exercises were designed to increase muscle strength. The patient performed the movement, first suppressing gravity and then against gravity. Managing control is a process that requires intense concentration and involvement.

Coordination, it is derived from a combination of activities of a certain number of muscles. The goal in coordination training was to develop the ability to freely produce automatic, multimuscular motor patterns. The correct sequence of muscle movements was used with adequate timing and force. Muscle synergy, practice and repetitions are important.

Fatigue resistance, the exercises were performed progressively, and above all performing functional activities.

Phase 1. Mild Intensity:25 min (5 weeks)

- 5 minutes of continuous warm-up (Mobilization exercises)
- 10 minutes of overload and resistance (Strengthening exercises with 1kg weights and functional activities)
- 10 min of flexibility and return to calm (Stretching exercises)

Phase 2. Moderate Intensity:35 min (5 weeks)

- 10 minutes of continuous warm-up (Mobilization exercises)
- 25 minutes of overload and resistance (Strengthening exercises with 2kg weights and functional activities)
- 10 min of flexibility and return to calm (Stretching exercises)

Phase 3. Strong Intensity:45 min (6 weeks)

- 12 minutes of continuous warm-up (Mobilization exercises)
- 20 minutes of overload and resistance (Strengthening exercises with 3kg weights and functional activities)
- 13 min of flexibility and return to calm (Stretching exercises)

Duration: 16 weeks

Frequency: 2 times a week

Repetitions: 10 per exercise

Session duration: from 25 to 45 min

DESCRIPTION OF THE EXERCISE PROTOCOL TO IMPROVE THE EXECUTION OF DAILY LIVING ACTIVITIES FOR OLDER ADULTS.

MOBILIZATION EXERCISES

Exercise 1

Perform affirmation movements (head up and down), denial movements (turning the head right and left) and lateral tilt.

Exercise 2

Perform shoulder movements back and forth.

3g exercise

Perform shoulder movements up and down.

Exercise 4

Perform a lateral raising movement of your arms until your hands come together above your head.

Exercise 5

Perform fist opening and closing movements.

Exercise 6

Make circular movements with your hands in fists both outwards and inwards.

Exercise 7

Sitting in the front half of the chair, slowly bend down to touch your feet and then return to the straight-back sitting position.

Exercise 8

Sitting looking forward. Turn your trunk to one side. Bring the hand that remains in front to the opposite knee and help yourself continue turning.

Exercise 9

Bend your knee backwards, trying to get your heel to reach the gluteal area. You can use a chair or the wall as

support to avoid losing your balance.

Exercise 10

Standing, perform rocking movements, balancing on the balls of your feet and then on your heels. You can use a chair or the wall as support to avoid losing your balance.

STRETCHING EXERCISES

Exercise 1

Back of neck, bring chin to chest and with both hands resting on the neck area, generate downward pressure.

Exercise 2

Side of the neck: hold one wrist behind the back with the other hand, to keep the shoulder of the arm pulled down. Then tilt the neck to the opposite side of the lowered shoulder.

Exercise 3

Back of thigh: in a sitting position with one leg stretched and the other supported, go with your hands to touch the tips of your feet.

Variation: In a position on your back, bend one knee and rest the sole of your foot, raise the other leg towards the ceiling and with both hands from the thigh gently pull towards the head.

Exercise 4

Anterior thigh: while standing, bend one knee back and take it with the hand on the same side from the ankle, pull towards the gluteus and bring the hip forward, you can use a chair or the wall as support to avoid losing your balance.

Exercise 5

Calves and soleus: advance one leg and flex it, keep the rear leg with the knee completely stretched and with the heel supported. Finally, bring your hips forward.

Variation: advance one leg and flex it, flex the back leg in the same way with the heel supported. Finally, bring your hips forward.

Exercise 6

Pectoral: sitting in a chair, open your arms as much as possible at chest height, pushing slightly backwards.

Exercise 7

Wrist flexors: stretch your arm in front of your body with your palm facing forward and fingers stretched downward. With the other hand take the fingers and pull towards the body.

Exercise 8

Wrist extensors: stretch the arm in front of the body with the back of the hand forward and the fingers flexed into a fist. With the other hand, take the fist and pull towards the body.

STRENGTHENING EXERCISES

Exercise 1

Sitting or standing, raise one arm toward the ceiling. Then without lowering your arm, bend your elbow, bringing your fist back.

Exercise 2

Sitting, rest your forearm on an armrest or on your thigh and with your palm facing up, bend your wrist up and down.

Exercise 3

Sitting or standing, hold a weight with your arms stretched to the side of your trunk and with your palms facing forward. Then bend your elbows, bringing your fists towards your chest.

Exercise 4

Sitting or standing, hold the dumbbells at your sides and at shoulder height, with your palms facing forward. Then raise both arms above your head, keeping your elbows slightly bent.

Exercise 5

Sitting on the front half of the chair with arms on the chest. Stand with your back straight. Optionally, you could add load to the exercise using a bottle or jerrycan with water, hugging it firmly at chest level.

Exercise 6

Stand, hold on to a chair, lift one foot. Release the chair and try to maintain your balance for at least 10 seconds. Optionally you could use a broomstick as a cane for balance or you can use a chair or the wall as support.

Exercise 7

Stand behind a firm chair and hold onto the chair for balance. Slowly lift one leg back, then alternate legs.

Exercise 8

Stand facing a wall, standing a little further than arm's length away. Lean your body forward and place your palms flat on the wall at shoulder height and in line with your shoulders. Move your body closer to the wall, trying to keep your back straight, and then move away. Optionally, you could increase the load of the exercise, starting with your feet further away from the wall.

Exercise 9

Stand behind a firm chair, with your feet shoulder-width apart. Slowly stand on your tiptoes, as tall as you can.

Exercise 10

Standing or sitting, hold a weight down at your sides, palms facing inward. Then raise both arms from the sides, until they reach shoulder height.

Exercise 11

Sit in a chair with your back against the back of the chair. Only the front of your feet and toes should touch the floor. Place a rolled towel on the edge of the chair and under your thighs for support. Then extend one leg forward as straight as possible, but do not bind or lock the knee. Your toes should point to the ceiling. Then alternate.

FUNCTIONAL ACTIVITY EXERCISES

Exercise 1

Upright shoulder row, lifting dumbbells vertically, flexing the elbow and shoulders.

Exercise 2

Shoulder rotations, sitting in a chair, perform circles with your shoulders forward and backward.

Exercise 3

Chair rise, sitting in a chair, with armrests, with one foot in front of the other, get up from the chair and sit down again.

Exercise 4

Wrist circumductions, make inward and outward circles with your wrists at the same time.

Exercise 5

Count with your fingers, oppose each of the fingers with the thumb in a synchronized manner between hands and applying light pressure; like counting the fingers of the hands.

Exercise 6

Hug, simulate a hug to yourself, press lightly and hold for 5 seconds to return to the starting position.

Exercise 7

Arm reach, sitting in a chair with feet resting on the body, simulate a push with the palms of the hand, one facing up and the other facing down

Exercise 8

Shoulder circumference, sitting in a chair with your feet on the floor, arms at your side, raise your arms straight until they touch your hands.

Exercise 9

Abduction of the scapulae, sitting in a chair, with your arms at the side of the body and with elbow flexion, push the elbows back and maintain the position for 5 seconds, and return to the initial position.

Exercise 10

Forward heel-toe gait

Exercise 11

reverse gear

Exercise 12

Lateral march

Exercise 13

Cross lateral gait

Statistic analysis

Regarding the information collected from the evaluations before and after the intervention, these were processed and described using the SPSS V21 statistical system, through descriptive contingency tables corresponding to the measures of the clinical variations of the level of independence of the older adults. While to determine the significant differences between these measures, the Wilcoxon rank test was used, when measuring a categorical variable in a longitudinal study. The significance for the test was 95% and a margin of error of 5% ($p<0.005$) (Hernández et al., 2011).

Ethical Considerations

This work is approved by the Human Research Ethics Committee of the Faculty of Health Sciences – UTA, dated 10-28-2023, and with an assigned code 033-CEISH-UTA-2023.

RESULTS AND DISCUSSION

Table 1. Analysis of the data from the initial physiotherapeutic evaluation from the administration of the Barthel index by activity

No.	Evaluated activities	Barthel Index Scores							
		0		5		10		15	
		Fr	%	Fr	%	Fr	%	Fr	%
1	Eat	0	0	30	100	0	0		
2	Transfer between chair and bed	0	0	0	0	30	100	0	0
3	Personal cleanliness	22	73	8	27				
4	Use of the toilet	0	0	27	90	3	10		
5	Take a shower	5	17	25	83				
6	Commute	0	0	0	0	16	53	14	47
7	Up and down stairs	0	0	26	87	4	13		
8	Dressing and undressing	0	0	30	100	0	0		
9	Stool control	0	0	0	0	30	100		
10	Urine control	0	0	0	0	30	100		

Score 0-5: personal hygiene, bathing/showering.
Score from 0-10:eating, using the toilet, going up and down stairs, dressing and undressing, stool control, urine control.
Score from 0-15: move between the chair and the bed, move.

The Barthel Index was applied to the 30 older adults who participated in the study to measure the level of independence they present during the execution of activities of daily living. Thus, specifically in the eating activities, 100% report a score of 5, which means that they need help cutting, spreading butter or using condiments. In the activity of transferring between the chair and the bed, 100% report a score of 10, which means that they need some physical or verbal help to do it. In personal hygiene, 73% reached a score of 0, stating that they need help to carry out their personal hygiene; while the remaining 27% achieved a score of 5, stating that they are independent in washing their hands, the house and their teeth. Regarding the use of the toilet, 90% had a score of 5 which indicates the need for some help, but they can do it alone; while the remaining 10% had a score of 10 indicating independent use of the toilet. In the activity of showering or bathing, 17% had a score of 5, which reflects a dependency or need for help; while 83% of the shelves achieved a score of 5, which

refers to independence in this activity. When moving, 53% of older adults obtained a score of 10, which means that they can walk with the little help of a person; while the remaining 47% achieved a score of 10, which refers to being independent for at least 50 meters with or without the use of any crutch, except a walker. When going up and down stairs, 87% of older adults scored 5 points, which means they need some physical or verbal help with any type of crutch; while 13% have reached 10 points, which means having independence to carry out this activity. Regarding dressing and undressing, 100% of the participants achieved a score of 5, which refers to needing help, but they can do approximately half of the activity without help. In stool control, 100% mention being continent, achieving a score of 10 on the scale, as in the urine control activity.

Table 2. Analysis of the data from the initial physiotherapeutic evaluation from the administration of the global Barthel index

Score Ranges	Dependency Level	Initial evaluation	
		Fr	%
0 to 20	DependenceTotal	0	0
21 to 60	DependenceSevere	6	20
60 to 90	DependenceModerate	0	0
91 to 99	DependenceLimited	24	80
100	Independence	0	0
Total		30	100

Overall, the participants in the Barthel Index, 20% representing 6 older adults, presented a level of severe dependence; while 80% were 24 participants who reached a low dependency level. This reveals the need for a physiotherapy intervention that favors the functional development of activities of daily living.

Table 3. Comparative analysis between measures (before and after the intervention) from the administration of the Barthel index by activities of daily life

No.	ActivityIt's from daily life	Initial Scores								Final Scores							
		0		5		10		15		0		5		10		15	
		Fr	%	Fr	%	Fr	%	Fr	%	Fr	%	Fr	%	Fr	%	Fr	%
1	Eat	0	0	30	100	0	0			0	0	0	0	30	100		
2	Transfer between chair and bed	0	0	0	0	30	100	0	0	0	0	0	0	0	0	30	100
3	Personal cleanliness	22	73	8	27					0	0	30	100				
4	Use of the toilet	0	0	27	90	3	10			0	0	0	0	30	100		
5	Take a shower	5	17	25	83					0	0	30	100				
6	Commute	0	0	0	0	16	53	14	47	0	0	0	0	0	0	30	100
7	Up and down stairs	0	0	26	87	4	13			0	0	1	3	29	97		
8	Dressing and undressing	0	0	30	100	0	0			0	0	2	7	28	93		
9	Stool control	0	0	0	0	30	100			0	0	0	0	30	100		
10	Urine control	0	0	0	0	30	100			0	0	0	0	30	100		

Score 0-5: personal hygiene, bathing/showering.
Score from 0-10:eating, using the toilet, going up and down stairs, dressing and undressing, stool control, urine control.
Score from 0-15: move between the chair and the bed, move.

After the intervention that the participants received, the level of dependency associated with activities of daily living was evaluated again. It was found that in the eating activity they went from a score of 5 to a score of 10 in 100% of the participants, achieving independence in this activity. In the activity of moving between the chair and the bed, 100% of the older adults went from a score of 10 to a score of 15, reporting independence in moving. In personal hygiene, 73% achieved that they had a score of 0, they went on to have a score of 5 or a score of 0, stating that they need help to carry out their personal hygiene; while the remaining 27% achieved a score of 5, ensuring that all participants showed independence in washing their hands, house and teeth. Regarding toilet use, participants who had a score of 5, which corresponds to 90% of the population, reached a score of 10; They achieved a level of independence in the entire population in using the toilet. In the activity of showering or bathing, 17% of participants who had a score of 0 went on to a score of 5, achieving independence in the entire population to shower or bathe. When moving, 53% of older adults who obtained a score of 10 moved to a score of 15, achieving independence in the entire population by moving at least 50 meters with or without the use of any crutch, except a walker. In going up and down stairs, of the 87% of older adults who scored 5 points, 84% achieved a score of 10 while 3% maintained a score of 5; In this way, 97% of the participants have independence to go up and down stairs. Regarding dressing and undressing, 100% of the participants went from a score of 5, which refers to needing help, but being able to do approximately half of the activity, without help; to a score of 10 which means having independence in dressing and undressing, including buttons, zippers, laces, etc. In the control of feces and urine, there were no differences between the measurements, since all participants already had a score of 10 on the scale, which refers to continence for the

two biological activities.

Overall, the participants in the Barthel Index, after the intervention, have gone from severe to moderate dependence in 3%, slight dependence in another 3% and 94% reached the level of independence. This revealed a clinical improvement in the performance of activities of daily living in older adults.

Table 4. Hypothesis Verification

	Initial Barthel Index - Final Barthel Index
Z	-5,058b
Asymptotic sig. (bilateral)	,000

to. Wilcoxon signed rank test
b. Based on negative ranges.

To verify the hypothesis, the Wilcoxon rank test has been applied and a significance level of 95% and an error of 5% has been used. Given that the variable is qualitative and the sample of participants in the study was less than 50 involved. Thus, it was possible to obtain a p value of 0.000, which, being less than alpha ($p<0.05$). It allows us to accept the research hypothesis and reject the null hypothesis. In this way, it can be said that there is a significant difference between before and after the application of the physiotherapy intervention in the level of dependency of the elderly in the "Mi Viejo Guaytacama" care unit.

Discussion

The aging process includes a series of physiological changes in the body. They are appreciated over the years such as movements that become slower, taking increasingly smaller steps and in many cases even prostrating the individual. This process is not the same for all people and depends largely on motor control, which is commanded and directed by brain structures. Thus, the relationship of movement and higher functions are closely linked. In this way, the development of therapeutic interventions aimed at improving motor control would have a great impact on diseases or conditions related to loss of movement, and especially in older adults who, from the age of 65, enter a stage of decline of their functionality. It can considerably alter their daily activities. (Chávez et al., 2014).

Therefore, the motor reeducation protocol to improve activities of daily living in older adults has the objective of developing or recovering voluntary muscle dominance. It is necessary to teach a muscle that has lost its function due to injury, disuse, atrophy or pathology, to recover it. The purpose is to improve functionality without tiring the muscle quickly; allowing them to carry out activities of daily living that are useful to those who practice it. The protocol was applied for 16 weeks, with a frequency of 2 times per week, and a session time of 25 to 45 min, depending on the phase. Once the intervention was completed, the execution of life activities in the older adults was assessed again, demonstrating a general improvement in the activities of eating, moving between the chair and the bed, use of the toilet, showering or bathing, moving, and personal hygiene such as control of feces and urine. In the activities of going up and down stairs, dressing and undressing including buttons, zippers, laces, etc., more than 90% demonstrated independence and less than 10% still needed some help to execute them. In this way, the Barthel index shows a considerable improvement in the level of independence of older adults, being evidenced by the transition from severe to moderate dependence in 3% of cases, to mild dependence in another 3% and independence in the remaining 94%. (Tarzona, et al., 2016, Laguado, et al., 2017).

Then it was concluded that the evidence shows that age or physical limitations are not barriers to acquiring or re-educating motor skills. Aging should no longer be conceived as a stage of decline, but rather as a phase of potentialization and improvement of capabilities. From this consideration, De Labra confirms that older adults seem to benefit from exercise interventions (De Labra, et al., 2015). Likewise, Moreira et al., (2018), mention that a multisensory exercise program significantly improves cognition, balance, mobility and functional performance. And Vasconcelos et al., (2016), found a significant relationship $p<0.05$ between muscle strength training and performance in basic activities of daily living and instrumental activities.

CONCLUSION

Although there is very little evidence of motor reeducation in the elderly, the evidence has found that programmatic and multimodal physical activity favors the functionality and development of activities of daily living and instrumental activities. Thus, the protocol was based on existing scientific evidence and on the initial findings of the execution of activities of daily living and the independence index of older adults, determining 16 weeks of duration, with a frequency of 2 times per week, and a session time of 25 to 45 min. The session time depended on the intensity, mobilization exercises, stretching, strengthening and functional activities. This application was validated through the content validation coefficient with a value of 0.96, which indicates excellent agreement between the judgment of three experts.

After the application of the protocol, significant clinical and statistical differences were found between measurements. So the majority of older adults achieved independence in all activities except in the activities of going up and down stairs, dressing and undressing including buttons, zippers, laces, etc. 10% of the elderly still needed some help to execute the activities. Similarly, in the Barthel index, a considerable improvement was seen in the level of independence of older adults, being statistically significant ($p<0.000$) and evidenced by the transition from a level of severe to moderate dependence in 3% of cases, mild dependence in another 3% and independence in the remaining 94%. In this way, it can be stated that the reeducation of the upper and lower limbs in older adults improves the execution of their daily living activities.

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