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Institutionalized elderly – a movement class results

Physiotherapy intervention

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INTRODUCTION

Considered a triumph for public health, there has been an increase of population's longevity as result of a gradual increase in social and economic development. All countries should be prepared for this demographic trend, which requires greater attention to health promotion and disease prevention in order to ensure community management strategies in the health system (WHO, 2007).

Increased life span may not result directly in increased levels of disability and reduced autonomy and functionality. However, the proportion of aging population with limitations tend to increase (Christensen, Doblhammer, Rau and Vaupel, 2009).

According Sibbritt, Byles and Regan (2007), the aging process is associated with physiological changes, resulting change and loss of function, which can lead to institutionalization.

Physical activity prevents the development of muscular atrophies and limitations articular and increase mineral bone, preventing the progression of osteoporosis (Kessenich, 2007).

Recommended physical activity for the elderly includes walking and exercises to increase strength, flexibility and balance (Peterson, Jones, and Rice, 2007).

OBJECTIVES

To evaluate the effects of a movement class in institutionalized elderly.

METHODOLOGY

A longitudinal study was done, with assessments performed before (T0) and after (T1) the movement class that ran during four weeks. A convenience sample with 30 subjects aged over 65 years was used. Subjects did not have pathologies that could interfere directly with balance and coordination and had a Timed Up and Go Test (TUG) with scores between 10.01 and 20 seconds (these were measured before T0) (Perracini , 2007).

Measurements were done at T0 and T1 with the use of: Dynamometer (tests muscle strength), Back Scratch Test (modified to test the upper limb flexibility), Chair Sit-And-Reach Test (tests the lower limb flexibility), Berg Balance Scale (tests balance), Efficacy Scale International Falls (FES-I) (tests fear of falling), TUG (tests mobility and balance), PPT -9 (tests physical performance) and MOS-SF-12.

A movement class with 45 to 50 minutes duration was performed by physiotherapists, throughout 4 weeks. Summed up, 12 sessions were performed three times per week.

STATISTICAL ANALYSIS

Statistically, the nonparametric Wilcoxon test was used to compare results between T0 and T1, with a confidence interval of 95%.

RESULTS

The sample comprised 30 patients with a mean age of 79.40 years (minimum value: 65 (minimum age inclusion criteria); maximum: 91). The Body Mass Index (BMI) averaged 24.66 kg/m2 (range: 14.84 - 36.06).

The MOS-SF-12 (physical dimension and mental dimension) and the PPT scores at T0 and T1 are shown in Table 1

Table 1 – Test values to MOS-SF-12 (PCS-Physical dimension; MCS- Mental dimension) and to PPT-9

Dependent Variables	Time	Minimum score	Maximum score	Mean	Stand. Deviaton	p
PCS-12	T_0	23,03	61,13	40,67	1,77	0,007
	T_1	27,89	56,89	43,54	1,65	
MCS-12	T_0	18,65	53,95	39,58	1,68	0,000
	T_1	25,71	61,94	48,30	1,87	
PPT-9	T_0	17,00	31,00	24,10	0,73	0,000
	T_1	19,00	33,00	25,80	0,61	

Tables 2 and 3 show the results obtained at T0 and T1, concerning muscle strength, flexibility, balance, mobility and fear of falling.

Table 2 – Values to dynamometry, Modified Back Scratch Test, Chair Sit-And-Reach Test, Berg e FES-I

Dependent Variables	Time	Minimum score	Maximum score	Mean	Stand. Deviaton	p
Strength in Internal Rotation (right upper limb)	T_0	1,00	8,00	4,18	0,33	0,000
	T_1	2,50	10,00	5,98	0,39	
Strength in External Rotation (right upper limb)	T_0	1,00	8,00	4,23	0,33	0,000
	T_1	1,00	9,00	5,77	0,35	
Hip extension (right side)	T_0	0,50	11,00	4,88	0,47	0,000
	T_1	1,00	13,00	6,60	0,59	
Plantar flexion (right side)	T_0	0,50	10,00	5,35	0,39	0,000
	T_1	3,00	14,00	7,63	0,52	
Dorsiflexion (right side)	T_0	2,00	10,00	5,78	0,38	0,000
	T_1	3,00	14,00	7,97	0,48	
Modified Back Scratch Test	T_0	-53,00	6,00	-27,39	2,39	0,000
	T_1	-53,00	7,00	-23,25	2,19	
Chair Sit-And-Reach Test	T_0	-38,59	8,00	-4,33	1,77	0,000
	T_1	-37,00	11,00	-1,17	1,55	

Table 3 – Test values to Berg, TUG e FES-I

Dependent Variables	Time	Minimum score	Maximum score	Mean	Stand. Deviaton	p
Berg	T_0	31,00	55,00	46,53	1,01	0,000
	T_1	34,00	56,00	49,83	0,91	
TUG	T_0	10,41	20,00	15,38	0,56	0,000
	T_1	10,07	17,17	13,36	0,46	
FES- I	T_0	18	47	31,30	1,54	0,000
	T_1	16	41	26,33	1,23	

DISCUSSION

At the end of the movement class, statistically significant gains were observed on the various variables. In the physical dimension of the MOS-SF-12, an increase of 2.87 points (from 40.67 to 43.54), with p = 0.007; the mental dimension, there was an increase of 8.72 points (39, 58 to 48.30), with p = 0.000. Several studies show that active individuals have higher levels of physical and mental quality of life (Miriam et al., 2008; Kerse et al., 2008). On the SF-12, there was a higher increase on the mental dimension (p = 0.000) when compared with the physical dimension (p = 0.007). This reinforces the assumption that physical activity is associated with mental and psychological well-being (Cerin et al, 2009).

In physical performance, measured by the PPT-9, there was a significant increase of the scores (from 24.10 to 25.80 at T0, T1), p = 0.000. This suggests that physical activity has benefits in terms of functional capacity (Miriam et al., 2008). Different studies have shown that physical decline associated with aging, can (even in subjects with extreme age) be reversed or at least minimized by physical activity (Deley et al., 2007).

With regard to muscle strength, it increased significantly in several movements. Numerous studies confirm the high plasticity in the aged muscle in response to strength training (Persch et al., 2009; Landi et al., 2010).

Furthermore, significantly higher values of flexibility of the upper and lower limbs were found in T1, with gains of 4.14 and 3.16 cm respectively (p = 0.000 for both) (Toraman and Ayceman, 2005). Hessert, Gucliucci, and Pierce (2005) demonstrated that 10 months to one year of physical activity, incorporating stretching exercises, coordination, muscle strength and balance, can significantly improve flexibility in elderly.

There was an increase in balance and mobility from T0 to T1 as the balance of the elderly increased significantly, with p = 0.000. (Barnett, et al, 2003; Mcdermott and Mernitz, 2006; Woo et al. 2007).

The fear of falling measured by the FES - I decreased from T0 to T1 after the completion of 12 class sessions of movement, with p = 0.000, which suggests that physical activity is associated with a better balance and a lower fear of falling (Bruin and Murer, 2007).

CONCLUSION

This study allowed us to conclude that participation in a movement class for 4 weeks, promotes significant results in the increase of health status/quality of life, physical performance, muscle strength, flexibility, balance, mobility and decreased fear of falling in institutionalized elderly.

According to Baltes and Smith (2003), we can conclude that older people, although in a situation of great vulnerability, can develop new skills. This reveals the existence of an adaptive capacity that enables them to successfully face the aging process.

REFERENCES

● Baltes, P. B., & Smith, J. (2003). New frontiers in the future of aging: From successful aging of the young old to the dilemmas of the fourth age. *Gerontology, 49*, 123-135. ● Barnett, A., Smith, B., Lord, S.R., Williams, M., & Baumand, A. (2003). Community-based group exercise improves balance and reduces falls in at-risk older people: a randomized controlled trial. *Age Ageing 32*, 407-414. ● Bruin, E., & Murer, K. (2007). Effect of additional functional exercises on balance in elderly people. *Clinical Rehabilitation*, 21, 112-121. ● Cerin, E., Leslie, E., Sugiyama, T., & Owen, N. (2009). Associations of multiple physical activity domains with mental well-being. *Mental Health and Physical Activity*, 2 (2), 55-56. ● Christensen, K., Doblhammer, G., Rau, R., & Vaupel, J. (2009). Ageing populations : the challenges ahead. *Lancet*, 374, 1196-1208. ● Deley, G., Kervio, G., Hoecke, V. J., Verges, B., Grassi, B., & Casillas, J. M. (2007). Effects of a one-year exercise training program in adults over 70 years old: a study with a control group. *Aging Clin Exp Res., 19* (4), 310-315. ● Hessert, M. J., Gucliucci, M. R., & Pierce, H. R. (2005). Functional Fitness: Maintaining or improving Function for Elders with Chronic Diseases. *Award – Winning Research Papers from the American Academy of Family Physicians – Annual Scientific Assembly, 37* (7). ● Kerse,N., Peri,K., Robinson, E., Wilkinson, T., von Randow, M., Kiata, L., Parsons, J., Latham, N., Parsons, M., Willingale, J., Brown, P., & Arroll, B. (2008). Does a functional activity programme improve function, quality of life, and falls for residents in long term care? Cluster randomised controlled trial. *BMJ*, 337, 907-915. ● Kessenich, C. R. (2007). Nonpharmacological prevention of osteoporotic fractures. *Clin Interv Aging, 2* (2), 263-266. ● Landi, L., Russo, A., Liperoti, R., Pahor, M., Tosato, M., Capoluongo, E., Bernabei, R., & Onder, G. (2010). Midarm muscle circumference, physical performance and mortality: Results from the aging and longevity study in the Sirente geographic area (ilSIRENTE study). *Clinical Nutrition*, 29, 441-447. ● Mcdermott, A. Y., & Mernitz, H. M. (2006). Exercise and Older Patiens: Prescribing Guidelines. *Am Fam Physician, 74*, 437-444. ● Miriam, C. *et al*. (2008). Effect of Physical Activity Guidelines on Physical Function in Older Adults *J Am Geriatr Soc. Author manuscript*, 56 (10), 1873-1878. ● Perracini, M. R., Okuma, J. G. L., Medeiros, P. R. S. (2007). *Avaliação Funcional do Equilíbrio Corporal e do Risco de Queda*. Retrieved from: http://pequi.incubadora.fapesp.br/ ● Persch, L., Ugrinowitsch, C., & Pereira, G. (2009). Strength training improves fall-related gait kinematics in the elderly: A randomized controlled trial. *Clinical Biomechanics*, 24 (10), 819-825. ● Peterson, D., Jones, G., & Rice, C. (2007). Ageing and physical activity: evidence to develop exercise recommendations for older adults. *Journal Public Health,* 98 (2), S69-108. ● Toraman, N. F. & Ayceman, N. (2005). Effect of six weeks of detraining on retention of functional fitness of old people after nine weeks of multicomponent training. *British journal of Sports Medicine, 39*, 565-568. ● WHO (2007). *Older people and Primary Health Care (PHC).* [Online]. Retrieved from: http://www.who.int/en/ ● Woo, J., Hong, A., Lau, E., Lynn, H. (2007). A randomised controlled trial of Tai Chi and resistance exercise on bone health, muscle strength and balance in community living elderly people. *Age and Ageing;* 36, 262 – 268.