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PROMOÇÃO DA INDEPENDÊNCIA FUNCIONAL EM IDOSOS INSTITUCIONALIZADOS

PROMOTION OF FUNCTIONAL INDEPENDENCE INSTITUTIONALIZED ELDERLY

PROMOCIÓN DE LA INDEPENDENCIA FUNCIONAL EN ANCIANOS INSTITUCIONALIZADOS

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RESUMO

Introdução: Com o envelhecimento verifica-se um declínio das funções físicas e cognitivas da pessoa idosa, o que leva ao comprometimento da sua independência funcional (F.I.).
Objetivo: Comparar a independência funcional de dois grupos de idosos com características inicialmente semelhantes, residentes numa Estrutura Residencial para Idosos, sedentários, sendo um dos grupos submetido a um programa de exercício físico (P.E.P.).
Métodos: Estudo quantitativo, de natureza quase-experimental. Recorreu-se a uma amostra de 20 idosos divididos em dois grupos semelhantes, experimental e controlo, de dez elementos cada. Um dos grupos praticou um P.E.P., que incluiu treino de força muscular e treino aeróbio, durante 12 semanas, 5 dias por semana, a uma intensidade moderada. Utilizou-se a Medida de Independência Funcional (FIM) para avaliar a independência funcional dos idosos num primeiro momento e, posteriormente num segundo momento, isto é, após a implementação do P.E.P. ao grupo experimental. A análise dos dados foi efetuada com recurso à estatística descritiva e inferencial, nomeadamente com o teste exato de Fisher, Mann-Whitney e Wilcoxon, considerando $p<0,05$.
Resultados: No final do estudo o grupo experimental melhorou a sua independência funcional nos subníveis "banho", "banheira e duche" e "escadas", mantendo todos os outros, enquanto o grupo controlo manteve a independência funcional em todos os subníveis avaliados.
Conclusões: A prática de exercício físico permite manter e/ou melhorar a independência funcional dos idosos.

Palavras-chave: idoso; exercício físico; independência.

ABSTRACT

Introduction: With aging there is a decline in the physical and cognitive function of the elderly, which leads to impairment of the Functional Independence (F.I.) of the elderly person.
Objective: To compare functional independence of two elderly groups with initially similar characteristics, living in a residential structure for the elderly, one of the groups being submitted to a Physical Exercise Program (P.E.P.)
Method: Quantitative, quasi-experimental study. A sample of 20 elderly people divided into two similar groups, experimental and control, of ten elements each. One of the groups practiced P.E.P., which included muscle strength training and aerobic training for 12 weeks, 5 days a week, at moderate intensity. The Functional Independence Measure (FIM) was used to evaluate the functional independence of the elderly at first, and then in second moment, that is, after the implementation of P.E.P. to the experimental group. Data analysis was performed using descriptive and inferential statistics, namely with Fisher's exact test, Mann-Whitney and Wilcoxon, considering $p <0.05$.
Results: At the end of the study the experimental group improved its functional independence in the "bath", "bath and shower" and "stairs" sub-levels, while maintaining all others, while the control group maintained functional independence in all evaluated sub-levels.
Conclusion: The practice of physical exercise allows to maintain and/or improve functional independence of the elderly.

Keywords: elderly; physical exercise; independence.

RESUMEN

Introducción: Con el envejecimiento se verifica un declive de las funciones físicas y cognitivas de la persona mayor, lo que lleva al compromiso de la independencia funcional (F.I.) de la misma.
Objetivos: Comparar la independencia funcional de dos grupos de ancianos con características inicialmente similares, residentes en una estrutura residencial para ancianos, sedentarios, siendo uno de los grupos sometido a un programa de ejercicio físico (P.E.P.).
Métodos: Estudio cuantitativo, de naturaleza cuasi-experimental. Se recurrió a una muestra de 20 ancianos divididos en dos grupos similares, experimental y control, de diez elementos cada uno. Uno de los grupos practicó un P.E.P., que incluyó entrenamiento de fuerza muscular y entrenamiento aeróbico, durante 12 semanas, 5 días a la semana, a una intensidad moderada. Se utilizó la Medida de Independencia Funcional (FMI) para evaluar la independencia funcional de los ancianos en un primer momento y, posteriormente en un segundo momento, es decir, después de la implementación del P.E.P. al grupo experimental. El análisis de los datos fue efectuado con recurso a la estadística descriptiva e inferencial, en particular con la prueba exacta de Fisher, Mann-Whitney y Wilcoxon, considerando $p <0,05$.
Resultados: Al final del estudio el grupo experimental mejoró su independencia funcional en los subniveles "baño", "bañera y ducha" y "escaleras", manteniendo a todos los demás, mientras que el grupo control mantuvo la independencia funcional en todos los subniveles evaluados.
Conclusións: La práctica de ejercicio físico permite mantener y/o mejorar la independencia funcional de los ancianos.

Palabras Clave: anciano; ejercicio físico; independencia.

INTRODUCTION

Aging is a progressive, universal and multifactorial process that occurs in a heterogeneous way, that is, each person ages in a unique and particular way. It is mainly in the Third Age, the stage where significant changes in physical, psychic and social conditions that condition the elderly person's adaptation to the environment and, consequently, their functional independence and quality of life (Park et al., 2014). The advances achieved with the industrial revolution have altered people's lifestyles, improving their quality of life, health and, consequently, longevity. In recent decades there has been an increase in the elderly population in industrialized countries and, in Portugal, about 20% of the population is over 65 years old (Portada, 2014). The woman, who until now was the traditional caregiver of the elderly in the family, began to enter the labor market (Barros et al., 2016), which led to a social, cultural, economic and family structure adjustment.

The advances achieved with the industrial revolution have altered people's lifestyles, improving their quality of life, health and, consequently, longevity. In recent decades there has been an increase in the elderly population in industrialized countries and, in Portugal, about 20% of the population is over 65 years old (Portada, 2014). The woman, who until now was the traditional caregiver of the elderly in the family, began to enter the labor market (Barros et al., 2016), which led to a social, cultural, economic and family structure adjustment.

Thus, as we see an increase in the average life expectancy, we are also witnessing an increase in the number of residential structures for the elderly, which assume the responsibility of caring for the elderly, dependent or independent, who can not remain with the family or in their own homes, providing them with housing, food, health care and social interaction (Carneiro et al., 2012).

In general, in the residential structures for the elderly, the activities developed by the elderly who live there are usually few, which is associated with the aging process and will condition their functional capacity. In this sense, the sedentarism common to all the elderly leads them to the loss of the autonomy and, to an increasing difficulty in performing the tasks of the day to day (Barros et al., 2016). The fragility of the elderly is a situation characterized by the decline of the various systems of the body and therefore their physical and mental capacities decrease, increasing their vulnerability to health problems (Fairhall et al., 2013). Functional decline is thus a factor to combat in this age group as a means of promoting health, increasing the sense of well-being, as well as reducing health costs.

In this context, was practized a P.E.P. to a group of elderly people living in a home of the Third Age in central Portugal as a means to promote their functional independence. Thus, this study aims to analyze the F.I. of the elderly, sedentary, before and after participation in a P.E.P. and then compare it with another group with initially similar characteristics but, who did not practice P.E.P..

1. PHYSICAL ACTIVITY AND FUNCTIONAL INDEPENDENCE IN THE ELDERLY

In the last century the increase of the elderly population worldwide has worried society in general and health professionals in particular, which has led to the development of health promotion and wellness programs for this age group (Crocker et al. Chow et al., 2014).

In this dynamic, by the analyzed studies, it was verified that the participation of the elderly in a P.E.P. may be a way to combat the sedentary lifestyle and thus maintain the independence of the elderly as long as possible. The training of components of physical fitness as a way of maintaining autonomy is a factor that plays a relevant role throughout life, that is, leads to a reduction of non-transmissible diseases, fewer falls, fewer health costs, as well as improvement of self-concept and self-esteem (Park et al., 2014).

The practice of physical exercise is seen as a way that leads the elderly to maintain or even improve their autonomy, as well as a way to prevent physical and mental illnesses, facilitating the adaptation of the elderly to the environment (Crocker et al. 2013).

Park et al. (2014) analyzed several studies on the effects of P.E.P. on the depressive symptoms, the quality of life and, the self-esteem, concluding that the practice of physical exercise improved all the variables studied, in this way the authors recommend the practice of physical exercise by the elderly.

Also Crocker et al. (2013) carried out an analysis of several studies whose objective was to analyze the effects of P.E.F. on the activities of daily living in elderly people living in nursing homes. The authors came to the conclusion that the independence of the elderly was improved through P.E.P., although they do not know which interventions are most appropriate to apply to this age group.

Also Gonçalves et al. (2010) analyzed the relationship between physical fitness and functional capacity of elderly people living in a residential structure for the elderly, verifying that F.I. and physical fitness are related, because the better the physical fitness (coordination, muscular strength, aerobic capacity, agility and coordination), the better the performance of daily activities.

Physical exercise consists of the planning, structuring and systematization of the corporal movements executed with the objective of maintaining or improving the physical capacity of the elderly (Borges, 2015; Breet et al., 2015).

One of the important factors for the elderly is the maintenance of their autonomy (Chow et al., 2014), that is, the ability to mobilize in the environment and to independently perform their basic activities of daily living (Rocha et al., 2017). In this sense the search for their health, social interaction and for pleasure leads the elderly to participate in P.E.P. (Castro et al., 2016).

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P.E.P. can be performed by training one or more components of physical fitness, although training involving more than one component of physical fitness in the same session is a still recent method when used to induce effects on health-related variables and maintenance of independence in the elderly population (Rocha et al., 2017).

2. METHODS

This study is characterized as a quantitative research, with a quasi-experimental design, with two groups: one experimental and the other control, each group consisting of 10 elements, where the experimental group was submitted to a program of physical exercise.

2.1 Participants

To select participants in the study FIM was applied to all the elderly living in a residential structure for the elderly, inserted in rural areas in central Portugal, which were to have, complete independence, modified independence or supervision in each sub-level of the six representative levels - self-care; sphincter control; mobility; locomotion; Communication; social cognition. In addition, they should be sedentary (this is not exercising for at least two years), which do not present with diseases such as: stroke, Parkinson's, disturbances of the body balance, visual deficit that makes it impossible to see and, uncontrolled clinical conditions such as hypertension or diabetes mellitus. Like this, 20 elderly were selected, which were later divided into two groups of 10 elements each, experimental and control, in a random way, in order to compare two groups initially similar, but that after the participation of the experimental group in a P.E.P., at the end of the study may present different characteristics.
Relatively to age in the experimental group, 40% were between 75 and 80 years old, 30% were less than 75 years old, and 30% were over 80 years old. The average age was 77.40 years. In the control group, 50% were between 75 and 80 years, 20% less than 75% and 30% more than 80 years. The average age of this group was 78 years. Most of the elements are female, 70% in the experimental group and 60% in the control group. As for schooling, 60% in the experimental group and 50% in the control group did not attend school, while the remaining elements had the first cycle of Basic Education. Comparing the groups, there were no statistically significant differences in the evaluated characteristics - age ($p = 0,543$), sex ($p = 1,000$) and schooling ($p = 1,000$).

2.2 Instruments

Participants were assessed by the FIM scale at two different times. At first, when all the elderly residents in the institution were evaluated and, in a second moment, this one that was after the experimental group to have practiced P.E.P.. It is necessary to take into account that the experimental group before starting the exercise program had to evaluate the muscular strength to adapt the load to be used in it, to teach to execute the movements with the correct technique and to use the scale of subjective perception of Borg effort (used to assess effort tolerance).
The FIM is a scale that has been translated adapted to the Portuguese population by Lains (1991). This instrument aims to assess what the person actually can do, as well as determine the help a person needs to perform motor and cognitive tasks. The FIM allows the evaluation of six levels: self-care, control of sphincters, mobility, locomotion, communication and social cognition, which are subdivided into 18 sub levels. Each sub-level receives the score from 1 to 7, which ranges from total dependence to complete independence. Each level is analyzed by the sum of the sub-levels that constitute it. The total value of the FIM corresponds to the sum of the value of the sub-levels in each level and ranges from 18 to 126 points.
The Cronbach alpha coefficient was determined to evaluate the homogeneity of the items that make up each of the dimensions of the FIM and, of all items in the set, obtaining the values presented in table 1. In the opinion of Maroco and Garcia-Marques (2006) values equal to or greater than 0,60 are acceptable, especially when the number of items is reduced. Thus, internal consistency can be said to be acceptable.

Table 1 – Cronbach alpha coefficients obtained for FIM

Levels	Nr. Of Items	1st evaluation	2nd evaluation
Self-care	6	0,445	0,528
Sphincter control	2	0,176	0,089
Mobility	3	0,000	0,000
Locomotion	2	0,375	0,480
Comunication	2	0,000	0,000
Social cognition	3	0,850	0,828
Total FIM	18	0,732	0,782

2.3 Dependent variable and independent variable

The dependent variable is the F.I. of the elderly, operationalized and measured by FIM, in the following items: Self-care (A-feeding, B-personal hygiene, C- D-wear upper half, E-wear half lower, F-use toilet); Control of sphincters (G-bladder, H-intestine); Mobility (I-bed, chair, wheelchair, J-toilet, K-bathroom / shower); Locomotion (L-marching / wheelchair; M-stairs); Communication (N-understanding, O-expression); Social cognition (P- social interaction, Q-resolution of problems, R- memory); Total FIM.

The independent variable is P.E.P. for the elderly. P.E.P. had a duration of 12 weeks, having been practiced 5 days a week (from Monday to Friday), always starting with a warming-up, passing through the fundamental part, and ending with the return to calm.

The warming-up period lasted 10 minutes, with no intensity, two sets of 10 repetitions of each exercise. This exercise consisted in the training movements for the upper limbs (oscillatory movements in the anteroposterior direction and crossing and at the level of the chest, in the orthostatic position and, to wander), lower limbs (gait, alternating type of gait - fast and slow, the latter being accompanied by movements of the upper limbs) and stretching exercises lumbar and hamstrings.

The fundamental part practiced on Mondays, Wednesdays and Fridays consisted of training of muscular strength and aerobic during 40 minutes. Muscle strength training was performed on the basis of the maximum weight test (Kim et al., 2002) of a maximal repetition (1RM), that is, 100% of 1 RM corresponds to the maximum weight that the person can handle certain motion. Based on this first evaluation it was adequate the weight used for the elderly to perform the planned exercises - initially 60% of 1RM and, later, from the ninth week 70% of 1RM.

Thus, the elderly performed muscular strength exercises that were: "lift and sit in a chair without arms, without hands", "flexion of the thigh", "lateral elevation of the upper limbs" and "extension of the thigh" with a intensity of 60% to 70% of 1 RM, two sets of each exercise, starting with 8 repetitions, to 10 repetitions from the ninth week, with a rest interval of 1 minute between sets, at a moderate speed, the which in Borg's subjective perceived exertion scale corresponds to 12 to 13, and then walked, gradually adding movements to the upper limbs and, up and down stairs, with an intensity of 12 to 15, according to the subjective perception of effort scale Borg.

On Tuesdays and Thursdays, the old people walked, initially on regular and later irregular terrain (sidewalk and sloping terrain), at different speeds and, up and down stairs with a maximum duration of 30 minutes.

Finally, the "return to calm", with a duration of 10 minutes, was practiced from Monday to Friday, without intensity, which began with a brief walk lasting for 1 minute at a slow pace and later stretching of the upper limbs, stretching of the sural triceps and stretching of the quadriceps, two sets of 10 repetitions, lasting 10 to 30 seconds, with an interval of 20 seconds between each exercise.

2.4 Ethical procedure

The study was approved by the institution where it was implemented on 5th Septembe, 2011 and, took into account five principles / rights that allow to protect the rights and freedoms of the people who participated in it, namely: right to self-determination, right to privacy, right to anonymity and confidentiality, right protection against discomfort and injury, and the right to fair and equitable treatment. In addition, the participants signed the informed consent form, which proves their knowledge and authorization to participate in the study.

As for the data collection, these were collected at first in March 2012 and then a second time in June 2012, after the experimental group had performed the P.E.P..

2.5 Techniques of data analysis and degree of confidence

We used the Statistical Package for the Social Sciences (SPSS) in version 20.0 to organize and systematize the information contained in the data and obtain descriptive and inferential results. Throughout the study statistical and statistical techniques (Fisher, Mann-Whitney and Wilcoxon) were used. In all tests, the value of 0.050 was set as the limit of significance.

3. RESULTS AND DISCUSSION

Maintaining functional independence, even in old age, is an essential condition for the elderly. In this sense, in table 2 we can analyze the values presented by the elements of the experimental group and the control group in the two moments of evaluation.

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Table 2 – Values obtained in the experimental group and in the control group in the two moments of evaluation.

		First evaluation		Second evaluation		Test of Wilcoxon
		Mean	Median	Average	Median	
Experimental Group	Self-care	6,63	6,67	6,73	6,83	P=0,014
	Sphincters	6,55	7,00	6,55	7,00	P=1,000
	Mobility	6,63	6,67	6,87	7,00	P=0,008
	Locomotion	6,25	6,00	6,65	6,50	P=0,011
	Comunication	6,65	6,75	6,80	7,00	P=0,083
	Social cognition	6,40	6,33	6,53	6,50	P=0,102
	Total FIM	6,54	6,53	6,70	6,69	P=0,007
Control Group	Self-care	6,58	6,50	6,58	6,50	P=1,000
	Sphincters	6,75	7,00	6,60	6,75	P=0,083
	Mobility	6,43	6,33	6,40	6,33	P=0,317
	Locomotion	6,35	6,50	6,35	6,50	P=1,000
	Comunication	6,80	7,00	6,75	7,00	P=0,317
	Social cognition	6,37	6,33	6,37	6,33	P=1,000
	Total FIM	6,54	6,53	6,51	6,50	P=0,059

The comparative analysis of the values obtained shows that, after participation in a P.E.P., the elderly tended to reveal a greater capacity for self-care. The comparison between the two moments of evaluation revealed statistically significant differences between these two moments (p = 0.014) in the experimental group. In the study of each of the levels that constitute this level, it was verified that the statistically significant difference occurred only in the level of "bath" (p = 0.025), and the elderly improved their level of independence. However, the elderly also improved another sub-level, but this was not found to be statistically significant, which was self-care "dressing the lower half of the body."

As for self-care "bathing" the elderly mostly had a need for supervision, where they needed to prepare the bathroom utensils, as well as being stimulated to wash the entire body from neck to feet with the exclusion of back, in the shower, to a situation where the majority no longer needed to be encouraged to perform this self-care, but it took longer to do so, and they did it in a chair with arms. The elderly have thus moved from a need for "supervision or preparation" to a need for "modified independence".

The analysis concerning the mobility level, the statistically significant difference lies in the sub-level use of "bath, shower" (p = 0.001). In this capacity the elderly mostly passed on a need for "modified independence" in which to enter and exit the shower took longer than normal and did not do so in total security, to a situation of "complete independence", where they entered and get out of the shower safely. Only one elderly woman went from a "supervision or preparation" situation where she needed to be encouraged to enter and exit the shower and required the presence of another person for a "modified independence" situation where she no longer needed of another person who encourages her to get in and out of the shower to a situation where she did but took some time.

As for locomotion, the statistically significant difference was found in "stairs". Here the elderly improved their ability to go up and down stairs (p = 0.014). In this sub-level "stairs", the elderly passed from a "supervision or preparation" condition in which they only climbed a flight of stairs in the presence of another person, because only then did they feel safe, for a condition of "modified independence", that is , they already ascend the flight of stairs without the presence of another person and, mostly use the handrail or, from a situation of "modified independence" to a condition of "complete independence", that is, they climb the flight of stairs without be necessary use the handrail.

Analyzing the obtained results, it was verified that in the control group there were no statistically significant differences between the moments of evaluation, that is, this group of elderly remained functional independence during the period of the study, while the experimental group improved in some sub levels to their F.I. and kept the others. This study allowed us to verify that participation in a P.E.P. allows maintaining and / or improving components essential to the F.I. of the institutionalized elderly person.

Similar to our study, Rocha et al. (2017) demonstrated in their study that the elderly in the experimental group showed significant improvements in functional capacity compared to the elderly in the control group. These authors performed an experimental study with elderly women, divided into two groups - experimental group and control group. The elderly of the experimental group underwent a training program of muscle strength and cardiovascular endurance for 20 weeks. Muscle strength training was performed three times a week, three sets of 8 to 10 repetitions, with a range of 1 to 2 minutes between sets and exercises, lasting 30 minutes, using a load of 70% to 85% of 1 RM. For cardiovascular training they used the step, with a frequency of 3 times a week, for thirty minutes, at an intensity between 70% and 89% of the reserve heart rate. Comparing the groups, it was verified that the elderly women in the experimental group showed a significant improvement in the instrumental

activities of daily living according to the lawton scale (p = 0.07), while the elderly women in the control group had a significant reduction in functional capacity according to the Katz scale (p <0.01).
Nogueira (2018) also carried out a study with 23 elderly people aged between 65 and 94 years, where they participated in a P.E.P. for 12 weeks, performed 3 times a week, each session lasting 60 minutes. The elderly practiced muscular strength training - 3 sets of 8 repetitions, with intensity of 50% of 1 RM in the first 6 weeks and 70% of 1 RM in the following weeks, with 1 minute interval between sets and exercises. At the end of the program, there were no statistically significant differences in their ability to perform self-care - walking, transferring, turning, elevating, toilet use, feeding, dressing and undressing however the values obtained showed a slight tendency for improvement.
Also Tiggemann et al. (2016) applied a muscle strength training program to women aged 60-75 years, which included 6 exercises for 12 weeks at an intensity of 13 to 18 according to Borg's subjective perception of effort scale. In the end, the authors found that participants had improved their functional performance only in the "step up" test.
Regarding sphincter control, communication and social cognition, there were no statistically significant differences between the two moments of evaluation.
Regarding sphincter control, the study is in agreement with the literature. According to Cândido et al. (2017) to improve urinary continence through exercise should be performed specific exercises for the pelvic floor muscles, as well as to improve bowel continence according to Ferreira et al (2012) through physical exercise it is also necessary to train the muscles of the pavement pelvic However, our study did not include the training of these muscles.
As for the communication, our study did not bring benefits to the participants, only allowed to maintain them. Training in group exercise, according to Bentancourt (2008), will promote social contacts and, consequently, may improve the ability to communicate, namely that the person is able to understand and express himself better. However, in our study, although the elderly performed the exercises in groups, each element performed them alone, there being no mutual interaction between the elements, which may be the reason for not obtaining gains at this level.
Also in the social cognition component there were no improvements, the program only allowed to maintain them (p = 0.012). With aging, changes in brain function occur. Short-term memory (the process used to acquire and retain new information) decreases with advancing age; however, long-term memory (knowledge acquired over the years) is little changed. According to Santos et al (2006), the elderly who participate in P.E.F., or other groups that require interaction between them, cognitive decline tends to be smaller.
Fernandez-Mayoralas et al (2015) carried out a study in long-term care institutions for the elderly, in which the elderly residents in these institutions were subdivided into three groups: active, moderately active and inactive. The authors concluded that moderately active elderly people with a certain degree of deterioration of physical and / or mental health are the ones who most benefit from physical activity programs that promote physical and mental health, thus delaying the decline cognitive impairment. In our study, the elderly did not present cognitive deficits, which may be the reason for no improvement at this level.

CONCLUSIONS

The present study shows that the P.E.P practiced by elderly residents in a residential structure for the elderly was an added value for them, since there were positive changes for some levels evaluated. Comparing this group to another group with similar characteristics, it was verified that the latter did not suffer alterations in the evaluated components.
Aging with family members is becoming a less common reality, with Third Age households playing an increasingly important role in this phase of people's lives. However, to combat the sedentary lifestyle of the elderly population, a feature widely observed in these institutions. In this dynamic, the practice of physical exercise was not only a way to combat sedentarism, but a means to improve functional independence.
Maintaining the physical and cognitive functionality is essential for the elderly, so that they can self-care, move in the environment and relate to other people, because all these attitudes are essential for achieving good quality of life.
However, the reduced size of the sample does not allow for generalization of results for populations with similar characteristics, and may overestimate the results. Future studies should include a larger sample.
Another limitation was the fact that the program did not bring benefits to the dimensions of communication and social cognition. In this dynamic, future studies should include the interaction between the group's elements in order to promote leisure and socialization.
Finally, there were few studies with institutionalized elderly people who participated in a physical exercise program training more than one component of physical fitness, just as none used a program that was instituted by us, which made it difficult to compare the results.

CONFLICTS OF INTEREST

I declare that there are no conflicts of interest.

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