

Physiotherapeutic intervention to promote self-care: exploratory study on Spanish caregivers of patients with dementia

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Abstract

The caregivers of dependent persons should benefit from social–health interventions that empower them. Physiotherapists can play an important role as facilitators of self-care learning by boosting the mind–body interaction. The aim of this study was to analyse the efficacy of a physiotherapeutic intervention centered on the promotion of self-care within a sample of caregivers, members of four Spanish Associations of Relative of Alzheimer's and other dementias. To fulfill the study goal, a pre-experimental study was developed with two different groups. Group 1 participated in four training sessions based exclusively on the communication of information and which addressed, among other aspects, the most frequent health problems in caregivers and the powerful role of self-care to face such problems. Group 2 received the same theoretical information as group 1, followed by 10 sessions of practical training in several concrete strategies of body–mind self-care. The results obtained support the usefulness of combining theoretical and practical training in mind–body strategies (relaxation, self-massage and stretching), as such combination managed to favor their implication to self-care and certain dimensions of psychological well-being, while attenuating the burden. Conversely, training based solely on theoretical approaches was not beneficial. Besides evidencing the usefulness of combining passive and active methodologies to favor self-care, the data provided calls for greater consideration of aspects close to philosophical perspectives like personal growth.

Keywords

Self-care, psychological well-being, intervention program, caregivers

INTRODUCTION

In addition to being considered resources or co-workers in the provision of emotional, physical and social support, family caregivers of dependent persons are also co-clients of health care, since they too present their own needs (Gómez, 2001). Such needs turn caregivers into a collective candidate for socio-health interventions aimed not only at improving the quality of the care they provide (Montorio *et al.*, 1995), but also at reducing their discomfort and minimizing the negative consequences of stress and the burden they often undergo.

Health promotion interventions on caregivers developed from the discipline of Physiotherapy, are certainly still scarce. Among such interventions, educational approaches based on the teaching of safe transfers have been put into practice, which has helped improve aspects related to both stress reduction and overload (Narekuli *et al.*, 2011; Hirsch *et al.*, 2014), such as the fear of falling (Turner *et al.*, 2013). Also from the discipline of Physiotherapy, the development of physical activity specially adapted for the treatment of back pain has been proposed (Manceau *et al.*, 2014), as well as multi-component exercise programs directed toward primary care, which have shown positive effects on the individuals' physical condition and quality of life (Cuadrado, 2017). Focussed on this same field of therapeutic exercise, interventions have been developed which were led by other health professionals. These works, based on aerobic modalities, strength or the combination of both, have shown positive effects on cardiac capacity, blood pressure and expression of anger (King and Brassington, 1997), perceived stress, depression and burden (Castro *et al.*, 2002) or self-efficacy (Connell and Janevic, 2009). We believe that caregivers can also benefit from the implementation of self-care strategies that increase the importance of psycho-corporal health interaction. Among the therapeutic strategies included in this type of approach, which is closer to body–mind medicine, would be relaxation, self-massage and Global Postural Reeducation, which combines body awareness and instructed breathing with global flexibility and toning (Bonetti *et al.*, 2010).

MATERIALS

Study design and eligibility criteria

The research conducted in this work was based on a pre-experimental study with two different groups and with three evaluations (pre-, post- and follow-up), carried out on a sample of family caregivers of dependent elderly people, members of four Spanish provincial branches (two rural and two urban) of the confederation 'Asociaciones de Familiares de Alzheimer' (AFA—Associations of Relatives of Alzheimer's) and other dementias. In Spain, health care for family caregivers of dependent elderly people is mostly provided by the public health services of the region in which they usually live. However, these family caregivers can also benefit from the implementation of socio-sanitary activities organized by the abovementioned AFA. These activities are mainly based on mutual support groups or respite interventions, or occasional psycho-educational activities mainly oriented by psychologists, social workers or nurses.

Among the inclusion criteria for taking part in the study, the following were determined: being of legal age, identifying oneself as the primary caregiver of a person with dependence, having a direct relationship with the patient and providing continuous care for a minimum of 1 year.

Procedure

The empirical part of this work began with several meetings with the managers of five associations of relatives of patients with dementia, who were presented with a written proposal for participation that included the different steps of the project. Once the proposal was evaluated, all the managing boards of the mentioned associations, with the exception of one, gave the consent to their participation in the program.

In agreement with the managers of each of the associations, a series of informative talks aimed at the members were scheduled to present the activities to be carried out and encourage their participation.

The associations informed their members of the setting of these informative sessions by post or by telephone, a few weeks prior to their occurrence.

In the informative sessions that were held, attendees were informed of the objectives of the program, the development and the schedule, as well as of the inclusion and exclusion criteria.

Although the attendance to the different informative sessions was numerous, many caregivers declined participating in the investigation due to lack of interest or difficulties to make it compatible with their working day or family care, among other reasons.

Once the subjects willing to participate in the study were determined ($n = 45$), the informed consent was signed and they were informed of the date and place of the initial evaluation. It consisted of a personal interview, conducted by one of the members of the research team, and the completion of a series of self-reports.

Within the personal interview, two sections were included: one aimed at obtaining information about the sociodemographic factors of the caregivers; and the other section about their involvement in self-care activities.

With regard to the involvement in self-care activities, a modification was made to the question of the Expert Patients Programme from the University of Stanford (SMRC, 2018), so that we could inquire about the total weekly time dedicated to self-care (*How much time do you spend taking care of yourself weekly?*). The answer to this question considered the time spent on the practice of aerobic therapeutic exercise, flexibility, strength and modalities directed toward stress management (relaxation, breathing exercises and yoga, among others). Participants had to estimate the total time spent throughout the week and then indicate a single response from the following five categories: (i) no time; (ii) <30 min per week; (iii) between 30 and 59 min per week; (iv) between 1 and 3 h per week; (v) >3 h per week.

The assessment protocol also included the completion of questionnaires concerning two other variables: psychological well-being and perceived burden.

To analyse psychological well-being, the caregivers were asked to complete the Ryff scale, with 39 items, which proposes a structure with six factors specific to well-being: *Self-acceptance*, *Positive relationships*, *Autonomy*, *Environmental Mastery*, *Purpose in life* and *Personal growth* (Díaz *et al.*, 2006).

This psychological well-being is more focussed on the development of abilities and the personal growth of individuals (González-Cabanach *et al.*, 2010), unlike that sustained by satisfaction with life and happiness (subjective).

The perception of burden by the family caregivers was measured with the ‘Escala de Sobrecarga del Cuidador’ (Caregiver Burden Scale), which is the Spanish version of the Caregiver Burden Interview questionnaire (Martín *et al.*, 1996). In addition to a total score, which allows to assess the perception of burden associated with care, this instrument includes three dimensions: (i) *impact* of care, related to all those issues associated with the effects that the caregiver has on the provision of care to an elderly relative; (ii) *interpersonal*, which refers to the perception of their relationship with the patient and (iii) *incompetence*, which refers to the caregiver’s beliefs and expectations regarding their own ability to care for the patient and their duty to do so, etc.

Once the assessment of the basic information on the participants was concluded (data collected at the end of January), the intervention itself began. The participants were divided into two groups. It is important to point out that the distribution of the participants was not randomized but by convenience, with the members located in the rural areas being assigned to group 1, while those belonging to the urban areas were included in group 2. The separation was made to avoid contamination between the participants and to avoid possible feelings of distrust of some belonging to group 1 and others belonging to group 2.

Before the start of the project training sessions, all participants were informed of the required need to perform a regular body–mind self-care work focussing solely on the activities that were to be taught until the research finished. The participants were repeatedly reminded of this warning at the end of each session.

The sessions developed with group 1 were exclusively based on the delivery of information (theoretical training). The theoretical training was provided in four sessions (Table 1). These sessions addressed general aspects related to the tasks of continued care (stress of the caregiver, effects and consequences of informal support tasks in their health, etc.) and the importance of taking an active role toward the care of one's own health, including appropriate therapeutic strategies as part of a general self-care action plan (self-stretches, etc.) and preventive and treatment proposals against some of the most common mild problems in the caregiver, such as contractures or lumbago. These lectures were held with a frequency of one session per month over four consecutive months (February, March, April and May), and lasted between 60 and 90 min.

At the end of the four theoretical sessions, recommendations were made to group 1 on the need to establish a weekly self-care plan with some of the activities discussed, such as passive self-stretches or self-massage with balls.

Group 2 participated in another training modality that was based on the combination of the same previously mentioned theoretical training (Table 1), plus a later specific training (practical training) in three types of mind–body self-care strategies (Table 2): (i) relaxation; (ii) self-massage; (iii) self-posture of Global Active Stretching (Figure 1), which is how the modality of autonomous application of the Global Postural Reeducation method is known.

The relaxation training included three types of exercises: progressive muscle relaxation, passive relaxation and breathing. Before beginning each exercise, the caregivers were told of the purposes of their practice (anxiety management, relief of muscle tension or pain, etc.), the expected benefits, the theoretical foundations of each exercise and their proper execution.

The training in self-massage exercises included three practical workshops where different work protocols were developed: one for the face, neck and spine, one for the upper limbs and another one for the lower limbs. These protocols included classic massage therapy maneuvers, such as superficial and deep rubbing, and kneading (with knuckles, etc.), carried out with the help of both hands and of different instruments, such as towels or balls.

The workshops on Global Active Stretching were based on the teaching of four postures (supine decubitus), each of them being learnt in a different session, according to the recommendations of the author of the method.

This second part of the intervention was developed in 10 sessions over 4 months (February, March, April and May), with a weekly frequency and a duration of 60–90 min per session. Thus group 2 completed a total of 14 training sessions.

It should be noted that all the training interventions, both theoretical and practical, were developed in group and led by one same trainer, a physiotherapist.

At the end of each training sessions, the participants were given written material which included a theoretical summary of the general aspects on the subject as well as instructions and photographs of concrete examples of application. Besides these, group 2 alone also received several compact disks with 10 recordings containing guided

instructions to the procedures addressed in the practical training workshops, to facilitate their autonomous application.

Also, at the end of each new practical training workshop, the participants of group 2 were given guidelines on the most appropriate way to integrate the different mind–body strategies learnt into a weekly self-care program. The ultimate recommendation was that such program should include at least one weekly session of self-massage and another one of active global stretching. Within the active global stretching session, the participants should combine a position of insistence on the upper limbs with one related to the lower limbs. As for the relaxation exercises, they were advised to do at least one session per day and whenever they found it necessary.

After the training phase of both groups, a second evaluation was carried out (post-training) 18 weeks after the beginning of the training (June). So, after the training phase, the autonomous phase began. The autonomous phase ended with a follow-up evaluation, which was carried out 36 weeks after the beginning of the training (October), thus finalizing the study.

The didactic contents of the different sessions were selected considering the available scientific evidence, by an interdisciplinary team made up of several physiotherapists experienced in the field of active aging and a psychologist with a long history in the study of psycho-emotional well-being in caregivers.

Statistical analysis

For the systematization and statistical analysis of the data collected in the three assessed moments (pre-training; post-training and follow-up), the statistical package IBM SPSS Statistics 19.0 was used (IBM Corporation, New York, USA), considering as reference a statistical significance value of 0.05.

The research included evidence related to the descriptive analysis of sociodemographic factors, the time of involvement in self-care, psychological well-being and perceived burden.

To test the normality of the variables under study and due to the small sample size ($n < 50$), the Shapiro–Wilk’s test was applied. For this same reason, together with the lack of normality of many of the variables, the selection of nonparametric tests was justified, for both the analysis of the homogeneity of each of the two groups under study at baseline

(Mann–Whitney’s test) and the differences between the subsequent intra-group (Wilcoxon’s test) and inter-group (Mann–Whitney’s test) evaluations. Correlations based on Pearson’s (r) and Spearman’s (s) tests were also carried out, on the variables resulting from the pre- and post-training differences, pre-training and follow-up and post-training and follow-up. Within the correlation between post-training and follow-up, the involvement in self-care was also taken into account, by considering the total value reached in the post-training and follow-up.

RESULTS

General characteristics of the studied sample

The analysis of the general characteristics of the studied sample group ($n = 36$ once the nine participants who had dropped out were eliminated) presents the profile of a family caregiver, mainly female (86.1%), with an average age of 60.89 years old ($SD = 10.63$), who is the daughter (47.2%) or spouse (41.7%) of the relative receiving the care and with a certain level of education (second grade studies in 52.8% of the cases). Regarding their context of origin, it should be noted that 14 were members of branches linked to rural areas and 22 were linked to urban areas.

Table 2 presents the general data of the three main variables: involvement in self-care, psychological well-being and perceived burden.

Effects of the interventions

This work intends to focus on the effects produced on the sample ($n = 36$) formed once the nine participants who had dropped out were eliminated. These dropouts, which happened at the beginning of the information delivery stage reduced group 1 (theoretical information) to 14 caregivers and group 2 (theoretical + practical) to 22 caregivers.

With regard to the two groups under study, we should point out their homogeneity at the beginning of the study (Table 2), both concerning the analysed sociodemographic factor of dependent contrast (age of the caregiver) and the three main variables (involvement in self-care, psychological well-being and burden). As far as these three variables are

concerned, Table 3 shows the intra-group changes observed between the three periods contemplated: pre–post-training, pre-training–follow-up and post-training–follow-up.

Table 4 refers to the significant inter-group differences found for the post-training and follow-up transitions.

Finally, the only correlation study that was significant is reported in Table 5, regarding the pre–post training differences for group 2 and the post-training time of involvement in self-care.

DISCUSSION

With respect to the general characteristics of the sample group, we have found other works containing data comparable to ours regarding a high number of women (Vicente *et al.*, 2009), with a similar average age (Slachevsky *et al.*, 2013) and a greater percentage of daughters than wives (Barba, 2007). However, other studies are discrepant when referring to samples with higher ages (Ponce, 2010) or mainly composed of spouses (Ocaña *et al.*, 2007). Regarding the level of education, we have found studies reporting participants with slightly lower levels of education (Martínez *et al.*, 2013), and others with higher levels (Peñaranda, 2006), these having been developed in environments with a historical trajectory and targeted at a higher education audience.

As far as psychological well-being is concerned, the scores observed for all scales were below those referenced in the study conducted in 2013 by Oliva *et al.* (Oliva *et al.*, 2013), based on a Spanish sample with a high percentage of individuals over 66 years old. Comparing the percentage of family caregivers who presented a high-intense level of burden (55.6%), we have found studies that show slightly lower data (46.77%) (Cuadrado, 2017). Nevertheless, other studies describe similar results or even higher levels of burden: 55.5% (Alonso-Babarro *et al.*, 2005), 62.9% (Slachevsky *et al.*, 2013) and 83.3% (Serrano-Aguilar *et al.*, 2006).

In light of the findings regarding the effectiveness of the physiotherapeutic intervention based solely on theoretical training (group 1), the only significant result worth noting was the decrease in the scores linked to the dimension of *positive relations* of psychological well-being.

This negative effect may be due to some of the limiting conditions of such intervention, namely the limited number of face-to-face sessions (four) and their time-spaced occurrence (once a month). It must be taken into account that the establishment of such relationships was surely one of the main incentives for caregivers to participate in the program, especially when considering the rural context in which the lives of the members of this group developed, where difficulties to establish support relationships are greater. This finding of undesirable unfavorable consequences in interventions on caregivers has also been referred by Zarit *et al.* (Zarit *et al.*, 1982), who explained the significant increase in depressive symptomatology at the end of their classes as an effect of the greater ‘awareness’ of caregivers regarding the limitations of their family members.

Within the intervention focussed on the combination of theoretical and practical training (group 2), is it worth highlighting the beneficial influence produced immediately after the sessions on the time of involvement in self-care, which was increased in 72.95 min per week on average.

Other interventions carried out with caregivers also managed to increase their dedication to self-care activities. Among them, we would like to point out those referred by Won *et al.* (Won *et al.*, 2008), which showed improvements of 22.8 and 8.8% among caregivers who devoted an hour or more to the practice of physical activity and relaxation, respectively. Kuhn *et al.* (Kuhn *et al.*, 2003) also achieved increases in 69.2 and 40.9% (physical activity and relaxation, respectively) among young adult caregivers who spent 1 h or less on such therapeutic strategies.

This physiotherapeutic intervention on group 2 also managed to favor four of the six scales that compose psychological well-being. Despite not having found self-care interventions to objectively compare them with, we believe that these results may be of interest for future research in the field of health promotion that seeks to deepen the knowledge of its possible effects on aspects related to philosophical or ‘more human’ perspectives.

Among these beneficial effects produced on psychological well-being, it is worth highlighting the improvements achieved in the two scales related to the development of human potential in a more genuine way: purpose in life and personal growth. This discovery shows that the dedication to certain self-care activities directed toward the binomial body–mind, supposes a personal significance for the caregivers, as it enables

them, among other benefits, to continue growing and developing their own potential. Our finding contributes to supporting what is defended by Lawton *et al.* (Lawton *et al.*, 2002) about the need for older adults to have ‘personal projects’ that structure their daily activities, be they health, intellectual or recreational, since these projects are related to a high level of well-being. Similarly, Villar *et al.* (Villar *et al.*, 2006) postulate that what is important is not so much that older adults remain active, but that the activity carried out has a high personal significance.

The theoretical–practical training also favored improvements in self-acceptance and autonomy at the end of the training (intra-group analysis), with that same group and time span showing higher values in the first scale and in the *Environmental Mastery*, in comparison with the group based solely on theoretical training (inter-group analysis). We believe that the highest values observed in these last two scales, which are closer to the notion of subjective well-being, would be in line with studies that corroborate the idea that positive well-being (life satisfaction, optimism) can encourage healthy behaviors by helping people cope with stress and manage challenges, persist in attainable goals or renounce unattainable ones, and by guiding them about the consequences of short-and long-term actions (Rasmussen *et al.*, 2006). That is to say that this type of well-being is not simply associated with or the result of healthy behaviors, but it also comes from them and facilitates them. Under this consideration, it has been demonstrated how older individuals with high levels of well-being are physically more active than others with lower levels (Strine *et al.*, 2008).

The mixed training proposal (theoretical–practical) also managed to help mitigate the perceived burden, in both the short (pre–post training) and the medium term (pre–training–follow-up), with the values of the two evaluations conducted after training being significantly lower than those shown by the other group studied.

Cuadrado (Cuadrado, 2017), from the field of primary care in physiotherapy, also managed to improve the perception of burden of a group of caregivers. This proposal, which was based on a multicomponent program with coordination exercises, strength and cardiovascular endurance, also paid special attention to the work of body and respiratory awareness, as in our most active intervention (group 2). However and contrary to our theoretical approach (group 1), their group focussing on care education showed a negative

effect on the perception of burden, as it was also observed by Zabalegui *et al.* (Zabalegui *et al.*, 2004).

Other interventions on caregivers focussing on exercise did not, however, detect a reduction in burden (King and Brassington, 1997; Hill *et al.*, 2007). These unfavorable results come to support certain opinions, such as that raised by Zabalegui *et al.* (Zabalegui *et al.*, 2008), who consider it one of the variables on which interventions to help caregivers make less impact.

It is also important to note the greater self-acceptance and purpose in life as well as the lower burden shown by group 2 when comparing the values of the 36 weeks with the basal ones. This indicates a noteworthy effect of this intervention in the medium term, especially when taking into account that, during half of the time elapsed between the two interventions (summer months), the caregivers did not have the support of the trainer or the group. This stage also had another unfavorable condition: its development at home. Our data is not in line with the conclusions of Crespo and López (Crespo and López, 2007), who argue that the results of interventions with caregivers of dependent elderly patients at home are usually not positive.

The time dedicated to post-training self-care did not correlate with the improvements in the perception of burden. We believe that this result can be explained based on what was postulated by Pope *et al.* (Pope *et al.*, 2017). These authors suggest that the opposite behaviors observed between their study and the one conducted by Lu and Wykle (Lu and Wykle, 2007) about the relationships between the perceived burden and self-care behaviors could be due to the personal characteristics of the caregivers. Such characteristics can influence them to relate differently to the role of caregiver, to stress, health and, consequently, to the prioritization of self-care. These characteristics include personal commitment to well-being, optimism, the capacity to rethink challenges as opportunities, resources and resilience. We believe that this same reason may also explain the absence of correlations observed for personal growth.

The improvements achieved in the burden and in the impact dimension as soon as the theoretical–practical training was finished were related to the beneficial effects favored in the scales that represent psychological well-being in a more genuine way: personal growth and purpose in life. The confirmation of this positive relationship would be in line with studies that defend the great weight that the caregiver's own characteristics have on

the impact of care on their health, even greater than that of variables related to the dependent family member (Baltar and Cerrato, 2005; Crespo and López, 2007).

This finding also supports theoretical postulates such as the one made by Cerrato *et al.* (Cerrato *et al.*, 1998), who defend the role of burden as a cognitive and emotional appreciation made by the caregiver before a 'stressing agent' (continuous care) of what can be followed for a better or worse adjustment, depending on the skills and resources (e.g. a high purpose in life) that they can count on.

All these results confirm the beneficial effects of training in self-care based on active methodologies, which has been reflected from the reinforcement achieved not only on cognitive and emotional characteristics (perceived burden), but also on those related to the philosophical field (capacity of development and personal growth, positive attitude toward oneself and maintenance of one's independence).

Although we have not been able to demonstrate it empirically, our impression is that the improvements produced by the theoretical–practical training have also influenced the positive effects achieved on other mediating variables that we do not control, such as better self-efficacy. In this sense, Villamarín and Sanz (Villamarín and Sanz, 2004) have argued that self-efficacy can act upon the improvement of health from its modulation of the emotional impact and physiological reactivity induced by psychosocial stressors. Around this variable there are studies, carried out in both the field of family care (Contador *et al.*, 2012; Semiatin and O'Connor, 2012) and contexts related to rehabilitation (Barlow, 2010), which have confirmed its relationship with distress (associated with anxiety, depression or burden), physical functioning and self-care activities, which would show that, it can positively influence the individuals' health.

This research work has some limitations that do not allow us to draw general conclusions from the results obtained. These limitations include not only the distribution of the two sample groups according to convenience but also the limited sample size. This last handicap, common in the interventions carried out in this population, is related to their lack of available time, which causes that, although they know of the existence of such interventions, they hardly benefit from them or they drop out in high percentages. Another limitation is the different context in which the daily life of the two study groups was developed (urban/rural), which may condition the behavior of other variables acting as mediators or modulators of the results. Among them would be the perceived social

support, which showed lower levels in rural caregivers than in urban ones on a Spanish sample (Gorlat-Sánchez *et al.*, 2013). The importance of support networks as basic elements in programs based on self-management has been supported by authors greatly recognized in this area (Lorig *et al.*, 2001), who defend their role to achieve behavior changes.

Our results may have also been conditioned by the different didactic support material and intensity used in the two study groups. This fact would be substantial considering the postulate by Vázquez *et al.* (Vázquez *et al.*, 2006), who claim that the effectiveness and duration of the effects of an intervention are partly dependent on the frequency and intensity used. However, Besenski (Besenski, 2009) contrarily argues that psychological well-being, also analysed in this study, *'is best explained by the experience during health-enhancing physical activity, rather than its level (duration, frequency, intensity).'*

The results of this study emphasize the need for caregivers to be cared for, so that both patients and caregivers continue to support and alleviate the national health system.

CONCLUSIONS

Family caregivers can benefit from physiotherapeutic interventions focussed on promoting their own care, such as those applied in this work. The harmful and beneficial effects caused in the two groups studied, confirm the suitability of combining passive methodological proposals (communication of information) with active ones (training in strategies). Despite the beneficial effects achieved with this intervention, we should not ignore the possible influence of certain limitations of the study on the results obtained and that prevent its generalization. Among them would be the lack of control over certain conditions such as the social support perceived by the caregiver or his experience during the practice of self-care.

The positive results regarding aspects close to philosophical perspectives, such as personal growth, raise the need for greater consideration of this area within the interventions based on self-management developed from the socio-health disciplines.

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Table 1: Summary of the contents of the training sessions

	Session number	Contents of the sessions
Communication of information ^a	1	<ul style="list-style-type: none"> • • Effects and consequences of long-term informal support tasks on the health of caregivers • Importance of an active lifestyle related to health: learning to be a proactive caregiver • Search for well-being (physical and mental): healthy behaviors
	2	<ul style="list-style-type: none"> • Self-care activities that promote well-being • Appropriate therapeutic modalities as part of a self-care action plan • Therapeutic exercises for the improvement of the physical condition (stretching, strength, aerobics). • Therapeutic exercises of relaxation/stress management (relaxation, breathing, self-massages)
	3	<ul style="list-style-type: none"> • Anatomy and biomechanics of the spine • Etiopathogenesis of lumbago and sciatica • Protection against neuromusculoskeletal disorders in the spine: school of back techniques for the mobilization of patients • Physiotherapeutic measures of self-care in cases of lumbago/mild-lumbago (relaxation, breathing, self-massage).
	4	<ul style="list-style-type: none"> • Protection and treatment of other mild neuromusculoskeletal disorders of frequent occurrence in caregivers: cervicalgia/tension headaches, shoulder pain, muscle cramps, carpal tunnel
Training in self-care strategies ^b	5	<ul style="list-style-type: none"> • Workshop of stress management I (tension-relaxation)
	6	<ul style="list-style-type: none"> • Workshop of Global Postural Reeducation I (frog on the ground with insistence on the upper limbs)
	7	<ul style="list-style-type: none"> • Workshop of Global Postural Reeducation II (frog in the air with insistence on the lower limbs)
	8	<ul style="list-style-type: none"> • Workshop of self-massage: back and face

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|----|---|---|
| 9 | • | Workshop of stress management II (passive relaxation) |
| 10 | • | Workshop of Global Postural Reeducation III (frog on the ground with insistence on the lower limbs) |
| 11 | • | Workshop of self-massage of upper limbs |
| 12 | • | Workshop of Global Postural Reeducation IV (frog in the air with insistence on the upper limbs) |
| 13 | • | Workshop of stress management III (respiration) |
| 14 | • | Workshop of self-massage of lower limbs |
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^a Completed by the participants from both groups.

^b Exclusively completed by the participants from group 2.



Fig. 1 Self-posture training of Global Active Stretching.

Table 2: Results regarding the variables *age of the caregiver, involvement in self-care, psychological well-being and burden* in the different categories for the sample under study at baseline, and study of the homogeneity between the two groups

Variables	Category	Percentages, mean values and standard deviation at baseline		p [U]
		Group 1 (n = 14)	Group 2 (n = 22)	
Age of the caregiver		61.14 ± 10.99	60.73 ± 10.65	0.961
Involvement in self-care	No time ^a	4 (28.6%)	10 (45.5%)	
	<30 min per week ^a	0 (0%)	1 (4.5%)	
	30–59 min per week ^a	0 (0%)	0 (0%)	
	1–3 h per week ^a	1 (7.1%)	5 (22.7%)	
	>3 h per week ^a	9 (64.3%)	6 (27.3%)	
	Total time (min per week) ^b	124.29 ± 83.08	77.05 ± 80.48	0.078
Psychological well-being of the caregiver	Self-acceptance ^b	21.71 ± 5.42	21.27 ± 2.47	0.682
	Positive relations ^b	24.21 ± 5.45	22.95 ± 3.94	0.569
	Autonomy ^b	28.92 ± 4.49	28.22 ± 4.11	0.659
	Environmental mastery ^b	23.07 ± 4.23	22.09 ± 3.33	0.578
	Purpose in life ^b	22.92 ± 5.35	22.95 ± 3.30	0.909
	Personal growth ^b	28.42 ± 3.43	26.95 ± 3.87	0.258
Burden	Global burden ^b	62.93 ± 15.66	58.14 ± 11.69	0.162
	Impact ^b	38.57 ± 9.32	34.45 ± 6.94	0.088
	Interpersonal ^b	14.71 ± 4.42	14.05 ± 3.18	0.443
	Incompetence ^b	9.64 ± 2.81	9.68 ± 2.98	0.948

^a Results expressed as number of caregivers and percentage.

^b Results expressed as mean ± standard deviation.

[U] Mann–Whitney's test;

Table 3: Comparison of the scores between pre- vs. post-training, pre-training vs. follow-up and post-training vs. follow-up for the variables related to involvement in self-care, psychological well-being and burden at intra-group level

		Intra-group [W]											
		Group 1 (n = 14) [W]						Group 2 (n = 22) [W]					
		<i>p</i>	<i>p</i>	<i>p</i>	Pre-training M ± SD	Post-training M ± SD	Follow-up M ± SD	<i>p</i>	<i>p</i>	<i>p</i>	Pre-training M ± SD	Post-training M ± SD	Follow-up M ± SD
		Pre- vs. post-training	Pre-training vs. follow-up	Post-training vs. follow-up				Pre- vs. post-training	Pre-training vs. follow-up	Post-training vs. follow-up			
Involvement in self-care	Minutes/week	0.152	0.207	0.789				0.002**	0.008**	0.405	77.05 ± 80.48	150.00 ± 44.40	141.14 ± 48.69
Psychological well-being	Self-acceptance	0.398	0.783	0.242				0.002*	0.003*	0.336	21.27 ± 2.47	23.04 ± 2.71	22.81 ± 2.44
	Positive relations	0.047*	0.024*	0.152	24.21 ± 5.45	22.28 ± 4.21	21.35 ± 4.06	0.419	0.384	0.893			
	Autonomy	0.461	0.725	0.972				0.034*	0.107	0.345	28.22 ± 4.11	30.95 ± 4.33	
	Environmental mastery	0.210	0.843	0.165				0.124	0.380	0.197			
	Purpose in life	0.906	0.551	0.598				0.004**	0.019*	0.104	22.95 ± 3.30	25.27 ± 3.95	24.54 ± 3.20
	Personal growth	0.298	0.283	0.407				0.018*	0.128	0.207	26.95 ± 3.87	29.36 ± 4.71	
Burden	Global burden	0.683	0.451	1.000				0.001**	0.001**	0.866	58.14 ± 11.69	50.09 ± 11.36	49.23 ± 11.53
	Impact	0.489	0.310	1.000				0.003**	0.004**	0.845	34.45 ± 6.94	30.14 ± 7.22	29.77 ± 8.01
	Interpersonal	0.431	0.705	0.878				0.000**	0.003**	0.598	14.05 ± 3.18	11.23 ± 3.05	11.45 ± 3.18
	Incompetence	0.505	0.330	0.598				0.002**	0.017*	0.229	9.68 ± 2.98	7.45 ± 2.30	8.00 ± 3.10

[W] Wilcoxon's test; M ± SD, mean ± standard deviation; *Significant at 0.05; **Significant at 0.01.

Table 4: Comparison of the significant scores in the post-training and follow-up moments for the variables related to involvement in self-care, psychological well-being and burden at inter-group level

		Inter-group [U]		Group 1 (n = 14)		Group 2 (n = 22)	
		<i>P</i>	<i>p</i>	Post-training	Follow-up	Post-training	Follow-up
		Post-training	Follow-up	M ± SD	M ± SD	M ± SD	M ± SD
Involvement in self-care	Minutes/week	0.008**	0.041*	81.43 ± 75.28	85.72 ± 80.54	150.00 ± 44.40	141.14 ± 48.69
Psychological well-being	Self-acceptance	0.035*		19.85 ± 4.89		23.04 ± 2.71	
	Environmental mastery	0.048*		21.71 ± 2.52		24.31 ± 3.82	
Burden	Global burden	0.017*	0.016*	61.43 ± 13.74	60.57 ± 12.17	50.09 ± 11.36	49.23 ± 11.53
	Impact	0.022*	0.018*	37.21 ± 9.40	36.79 ± 9.28	30.14 ± 7.22	29.77 ± 8.01
	Interpersonal	0.021*	0.018*	13.93 ± 3.45	14.07 ± 2.81	11.23 ± 3.05	11.45 ± 3.18
	Incompetence	0.007**		10.21 ± 3.68		7.45 ± 2.30	

[U] Mann–Whitney’s test; M ± SD, mean ± standard deviation; *Significant at 0.05; **Significant at 0.01.

Table 5: Significant correlations between the post-training time of involvement in self-care and the variables with changes between the pre- and post-training in group 2 ($n = 22$)

Variable	Involvement in self-care post-training	Self-acceptance	Autonomy	Purpose in life	Personal growth	Global burden	Impact	Interpersonal	Incompetence
Involvement in self-care post-training									
Self-acceptance	0.466*[S]								
Autonomy	0.436*[S]	0.533*							
Purpose in life		0.509*							
Personal growth									
Global burden					-0.423*[S]				
Impact				-0.450*		0.775**			
Interpersonal						0.593**			
Incompetence						0.493*		0.434*	

[S] Spearman's correlation;

*Significant at $p < 0.05$ (bilateral);

**Significant at $p < 0.01$ (bilateral).