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Behavioural intervention to reduce disruptive behaviours in adult day care centres users: A randomizsed clinical trial (PROCENDIAS study)

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Abstract

Aim: This study assesses the effect of an intervention to reduce the disruptive behaviours (DB) presented by care recipient users of adult day care centres (ADCC), thereby reducing caregiver overload. While ADCC offer beneficial respite for family caregivers, the DB that many care recipients show promote resistance to attending these centres, which can be a great burden on their family caregivers.

Design: Randomized controlled clinical trial.

Methods: The study was carried out with 130 family caregivers of people attending seven ADCC in the municipality of Salamanca (Spain), randomly distributed into intervention and control groups. The intervention was applied across eight sessions, one per week, in groups of 8–10 people where caregivers were trained in the Antecedent-Behavior-Consequence (ABC) model of functional behaviour analysis. The primary outcome was the reduction of DB measured with the Revised Memory and Behavior Problems Checklist (RMBPC).

Results: An average reduction in the RMBPC of 4.34 points was obtained in the intervention group after applying the intervention ($p < 0.01$ (U de Mann–Whitney); Cohen $d = 1.00$); furthermore, differences were found in the Center for Epidemiologic Studies Depression Scale (CES-D) ($U = -2.67$; $p = 0.008$; Cohen $d = 0.50$) and in the Short Zarit Burden Interview (Short ZBI) ($t = -4.10$; $p < 0.01$; Cohen $d = 0.98$).

Conclusion: The results obtained suggest that the implementation of this intervention could reduce both the frequency of DB occurrence and the reaction of the caregiver to their appearance. Improvement was also noted in the results regarding overload and emotional state of the family caregiver.

Impact: To our knowledge, this is the first randomized clinical trial to show that an intervention based on the ABC model could reduce the frequency and reaction of DB of care recipients in ADCC increasing their quality of life, and improving the mental health and overload of their family caregivers.

1 | INTRODUCTION

Recent decades have seen decreasing birth and mortality rates, and increases in chronic diseases, leading to a significant rise in people in situation of dependency requiring care from different care systems (WHO, 2017). Today we are aware of the consequences of care for the caregiver, both physically, socially and emotionally (Ransmayr et al., 2018; Schulz et al., 2020) and attending to the needs of family caregivers has therefore become one of the great challenges of social policy.

The above negative consequences of care may be aggravated by the appearance of neuropsychiatric symptoms (Machnicki et al., 2009). These symptoms in care recipients represent the greatest predictor of premature institutionalization (de Vugt et al., 2005). In addition, they are associated with a faster degenerative process (Rabins et al., 2013) and with early death, since these symptoms are linked to the degree of disease progression (Allegri & Roque, 2015). These facts contribute to the increasing overall costs of patient care, caregivers and the healthcare system (Anatchkova et al., 2019; Kales et al., 2015; Knapp et al., 2016; Rattinger et al., 2016). It has been described that up to 90% of people with dementia present with neuropsychiatric symptoms at some time during the course of the disease (Cerejeira et al., 2012; Desai et al., 2012) and, in addition, these symptoms are associated with disease severity (Chen et al., 2017; Peters et al., 2015) and worse quality of life for both patients and caregivers (Cerejeira et al., 2012). Among the different types of neuropsychiatric symptoms reported in the literature, it is disruptive behaviours (DB) which generate the greatest degree of distress or reaction in caregivers, more so than problems of memory or depression (Fauth & Gibbons, 2014).

2 | BACKGROUND

Adult day care centres (ADCC) have become one of the main sources of care in the community for people in situation of dependency and are recognized as services that can help these people live longer in their own homes (Kelly et al., 2016; Orellana et al., 2020). ADCCs are also services aimed at supporting family caregivers, helping them reduce their levels of stress, exhaustion, depression and anger (Zarit et al., 2011); thus they offer both a program of activities for dependents and a respite service for carers (Behrndt et al., 2017; Orellana et al., 2020).

However, the use of ADCCs may be limited by the reluctance to visit them given the DB that people in situation of dependency may display in relation to attending (Arksey et al., 2004). One of the specific situations when DB may appear is during ADCC assistance. Many caregivers perceive this as another cause of stress, especially if DB appear when the time comes to go to the ADCC (Brodaty et al., 2005). Resistance by the care recipient to carrying out the tasks associated with travelling to the ADCC has been identified as an important potential obstacle to their greater use (Gaugler et al., 2005) and for some caregivers, anticipating the situations that may arise regarding ADCC attendance due to the lack of cooperation by their relative is one of biggest obstacles to using this service (Brodaty et al., 2005).

Support for caregivers by healthcare staff in both primary care centres and ADCCs has also been described as an important factor in adapting to these types of services (Davison et al., 2019) since it seems important to provide information that can break down barriers and help caregivers find the right time to attend ADCCs (Phillipson & Jones, 2012). Nursing professionals have an important role in this process due to the fact of having a unique position to provide supportive interventions to caregivers (Becque et al., 2020).

In Spain, the responsibility of public institutions to provide support to people in situation of dependency is regulated by a specific law (Boletín Oficial del Estado, 2006). The level and type of support provided by public institutions will differ depending on the functional state and will be managed by their relatives. Psychological support is only provided by Primary Health Care for severe cases that are referred to the Mental Health Units. That is why it is considered necessary to strengthen this care for caregivers from the ADCC.

Although DB are one of the most frequent challenges faced by family caregivers of people attending ADCC, there are no intervention studies with robust designs which have been implemented in response to this issue, except for the pilot study previously performed. The results of this pilot study conducted by Nogales-Gonzalez et al. (2014) suggested that a behavioural intervention based on the Antecedent-Behavior-Consequence (ABC) model of functional behaviour analysis (Teri & Logsdon, 2000) could be effective in reducing the occurrence of DB related to ADCC assistance.

The classic ABC model of functional behaviour analysis is used in mainstream psychological research and comprises the analysis of antecedents, behaviours and consequences (Teri & Logsdon, 2000). This model argues that events occurring immediately before a behaviour problem (background) can act as triggers of the behaviour problem and that events occurring immediately after the behaviour problem (consequence) can influence the occurrence or maintenance of the problem. For all these reasons, it

seems necessary to carry out an intervention based on the ABC model of functional behaviour analysis to influence the DB of ADCC users and improve the mental health and level of overload of the participating caregivers.

3 | THE STUDY

3.1 | Aim

This study seeks to assess the effectiveness of a behavioural intervention program aimed at family caregivers to reduce the DB of ADCC users. Likewise, the effect of this intervention in reducing caregivers' mental health issues and overload has been analysed.

3.2 | Design

This is a randomized controlled clinical trial. The protocol (Rodriguez-Sanchez et al., 2018) was registered in Clinical Trials.gov (NCT03057184). To carry out this randomized trial, the indications in CONSORT 2010 have been followed.

3.3 | Sample

The study was carried out in seven ADCC in the municipality of Salamanca (Spain). The reference population was people attending ADCC and the relatives who participate in their care and who identify themselves as principal caregivers for this task. The family caregivers agreed to participate in the study. The study included 130 caregivers, 49 in the intervention group (IG) and 81 in the control group (CG) and 111 completed the study.

Of those undergoing the baseline assessment, 12% were not assessed at 6 months, mainly due to institutionalization or death of the family member, or because they dropped out of the study. The number of those who failed to finish the study by refusing to continue was greater in the control group (one participant in the IG versus six in the CG) (Figure 1).

3.3.1 | Inclusion criteria

1. Participants in the study were those family members who identified themselves as primary caregivers of a person attending the ADCC at least 2 days a week; 2. Family caregivers performed or
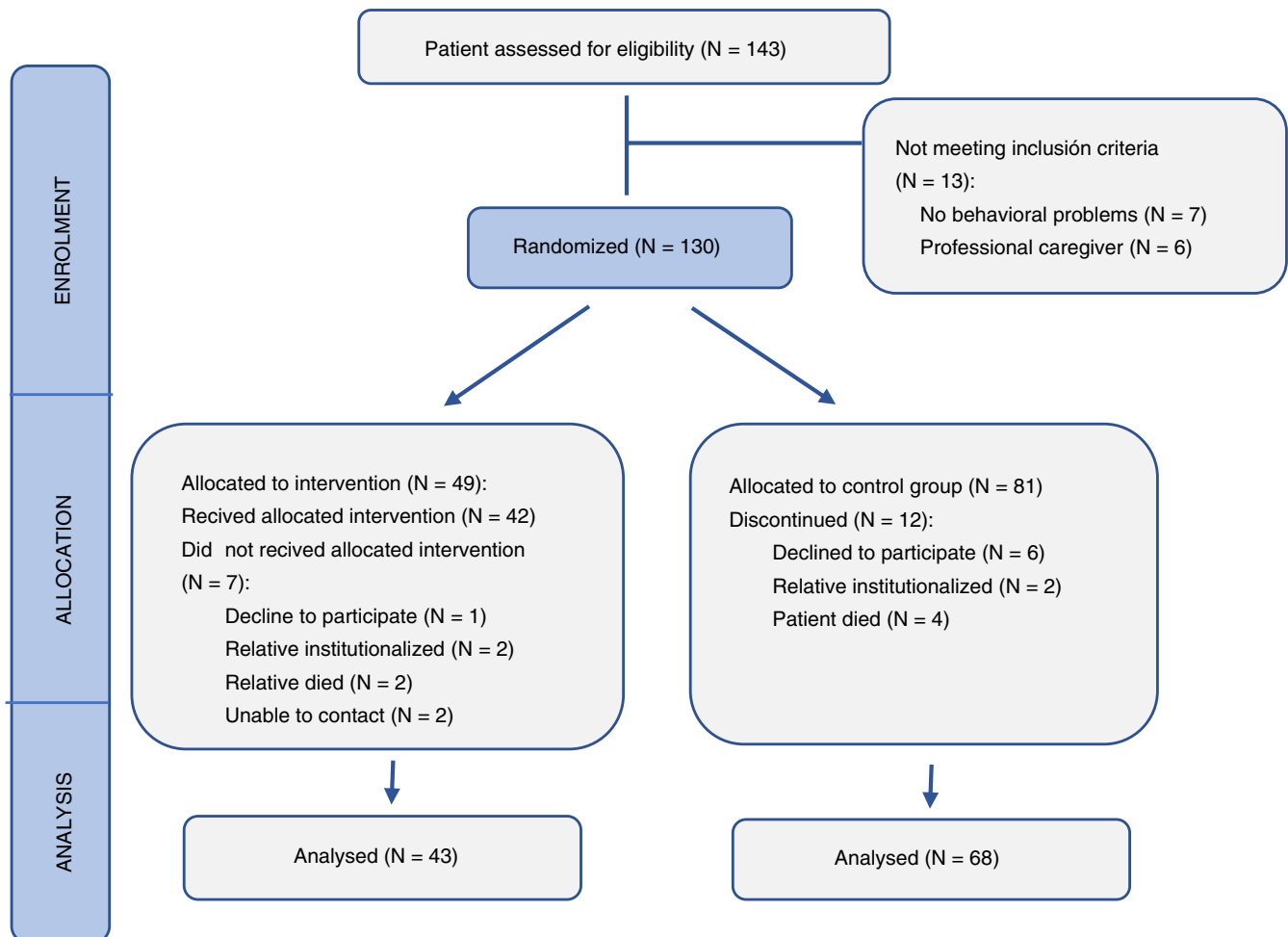

FIGURE 1 Flowchart of caregivers in the trial [Colour figure can be viewed at wileyonlinelibrary.com]

participated in organizing the care recipient preparation to visit the ADCC, with or without the help of another person. We defined 'preparation for attendance' as all the activities performed by the caregivers in interaction with the patient, from the moment when they begin to prepare until they get into the vehicle taking them to the ADCC, with the aim of facilitating their ADCC attendance. This includes, for example, getting them out of bed, helping them shower and get dressed, assisting them at breakfast or helping them to walk and use the stairs; 3. Family caregivers recognized the existence of at least one DB associated with difficulties for attending the ADCC care; and 4. Signature of informed consent by family caregivers.

3.3.2 | Exclusion criteria

1. Paid caregivers; 2. Family caregivers who did not participate in the preparation for the ADCC visit; 3. Those who did not sign informed consent; and 4. Care recipients who did not present DB related to ADCC attendance.

3.3.3 | Recruitment

After presenting the study to the person responsible for the all the ADCC of the municipality, the project was explained to the nurses and other health professionals from the centres agreeing to collaborate in the development of the study. A research advisory committee assigned at least one professional from each ADCC to collaborate with the research team to assess the needs and preferences of the participants and share the study results. The information for family caregivers was disseminated by the centre in a letter explaining the reason for the study and asking for their collaboration. Recruitment was carried out during 2017–2018. Figure 1 shows the recruitment flowchart for the 130 participants.

3.3.4 | Sample size

Sample size was estimated to detect a difference of three points in the total score of the main variable RMBPC, as the difference in the control group found in the basal study was close to three points (Basu et al., 2015). It has been considered that a higher score could be indicative of a relevant

change. Estimation based on a difference in means (_T_-Student), assuming a common standard deviation of 5.7 points, a type-I error rate of 0.05 and a type-II error rate of 0.20, with a ratio of 1:2 between the two groups, 43 participants would be required in the intervention group and 86 in the control group, resulting in 127 participants in total.

3.4 | Data collection

3.4.1 | Procedure

All ADCCs in the city were invited to participate in the study and those centres agreeing to do so sent an information letter about the project to the home of each of their users inviting them to participate in the study. Caregivers who agreed to participate reported at their centre and the centre contacted the research team. Participants received a telephone call from the research team after about 10–15 days to arrange an appointment and perform the baseline evaluation. The assessments were made either at the ADCC or at the relevant health centre. Those that met the inclusion criteria were subsequently selected. Once this phase was finished, the caregiver was assigned to the intervention group (IG) or control group (CG), in accordance with a previously randomized sequence. The assignment sequence was generated by an independent researcher using Epidat 4.2 software (Consellería de Sanidade - Xunta de Galicia, 2016) with a 1:2 a ratio. The selected family caregivers were informed that a weekly session of 90 min would be held over a period of 8 weeks in groups of 8–10 participants each. Caregivers of relatives with different pathologies were included. The same evaluation was performed for the CG and the IG at baseline and at 6 months after randomization. The estimated data collection time was 6 months after the baseline assessment for the CG with a 2-week margin. In the case of the IG, data were collected from 2 to 6 weeks after the final intervention session.

3.4.2 | Intervention

The intervention consisted of eight sessions, one per week, lasting approximately 90 min in groups of 8–10 family caregivers (Table 1) and was carried out in the ADCC or health centres where appropriate material and human resources were available to ensure the successful

TABLE 1 Content of intervention sessions

Session 1	Presentation of the program. Analysis of expectations. Group rules. Relaxation technique.
Session 2	Introduction to the ABC functional analysis model. Learn to operationalize.
Session 3	Behavioural consequences. Difference between attention, avoidance and escape.
Session 4	Antecedents of the behaviours. Learn to differentiate them.
Session 5	Promote communication and autonomy. Verbal and non-verbal communication.
Session 6	Learning to ask for help: Communication skills.
Session 7	Keys to managing behaviour problems. Background and consequences. Reinforcers and punishments.
Session 8	Content closure. Evaluation questionnaire and satisfaction questionnaire.

implementation of the project activities. Although the aims of the intervention, and the general plan of content and the techniques proposed were implemented through a group dynamics methodology, the intervention was adapted to the specific DB mentioned by each caregiver. Each group was coordinated by a psychologist trained in behavioural analysis and a co-therapist. In the initial sessions, each caregiver went into more detail about the DB of their relatives occurring before attending the ADCC which caused them the greatest distress. Afterwards, participants were trained in the classic ABC model of functional behaviour analysis (Teri & Logsdon, 2000).

Participants were told what this model consists of and the components of this model were analysed according to the DB that caregivers reported. After analysing the antecedents, DB and consequences of each of the participants, the psychologist proposed a specific intervention program providing the caregiver with a functional analysis and training in the intervention techniques to be implemented. A general outline of program contents and the techniques proposed for each session were documented in a manual (available from the corresponding author on request).

3.4.3 | Variables and measurement instruments

The primary outcome was the reduction of the frequency and reaction to care recipients as measured through the Spanish version (Nogales-Gonzalez et al., 2014) of the DB subscale of the Revised Memory and Behavior Problems Checklist (RMBPC; Teri et al., 1992). This scale offers two dimensions, the frequency of the DB and the caregiver's reaction to these DB that occurred during the previous week. The scale is divided into eight items. The frequency subscale ranges from 0 (it never occurs) -4 (occurs daily or more often), and the reaction subscale, from 0 (not at all) -4 (extremely). This test has been used in other studies to assess the impact of the presence of neuropsychiatric symptoms in caregivers of dependent people (Nogales-Gonzalez et al., 2015) and it has been associated with overload and depressive caregiver symptoms (Basu et al., 2015; Jackson et al., 2014). The scale had good internal consistency in this study ($\alpha = 0.86$), as did the subscales of frequency ($\alpha = 0.71$) and reaction ($\alpha = 0.76$).

Secondary outcomes include measures of caregivers' mental health and overload. The 12-item version of the General Health Questionnaire (GHQ-12) (Goldberg & Hillier, 1979) was used to measure caregivers' self-perceived mental health. The GHQ-12 is one of the most widely used screening instruments for common mental disorders. The GHQ has also been used to evaluate the effectiveness of group therapy based on cognitive-behavioural principles (Lincoln et al., 2011). It includes the dimensions of cognition, physiology, general welfare, confronting challenges and individual self-assessment. However, it has been identified as an essentially one-dimensional test and it is not recommended to interpret this questionnaire based on its subscales (Gnambs & Staufenbiel, 2018). This test has been validated in 15 countries and specifically with older people. With a maximum score of 36, higher scores reflect worse mental health, indicating the presence of anxious and/or depressive symptoms. The

items were scored from 1 (always) to 4 (never). The internal consistency of the questionnaire in this study was $\alpha = 0.89$.

The Centre for Epidemiologic Studies Depression Scale test (CES-D; Radloff, 1977) has been used to measure depressive symptoms. It is a Likert-type scale with 20 items, with a scoring range from 0 (never or almost never) -3 (always or almost always). A higher score suggests a greater probability of clinical depression. This scale has been used with caregivers, demonstrating good psychometric properties (Losada et al., 2012). The internal consistency of the scale in this study was $\alpha = 0.71$.

Caregiver stress and overload were measured through the short Zarit Burden Interview (short ZBI; Gort et al., 2005). This scale has high sensitivity and specificity in addition to a positive predictive value of 95.45% and a negative predictive value of 100% in defining caregiver burden. The short and screening versions of the Burden Interview produced results comparable to those of the full version (Gort et al., 2005). The internal consistency of this test in this study was $\alpha = 0.89$.

In addition, sociodemographic information was collected from caregivers. Sociodemographic variables included caregivers' age and gender, current occupation, marital status and years of schooling. Furthermore, length of time of caregiving was also assessed. Sociodemographic variables of the care recipient included age, gender, marital status, years of schooling and type of illness (dementia or no-dementia).

3.4.4 | Validity and reliability

Randomization and intervention were implemented by a different researcher to the one carrying out the assessment, who remained blinded throughout the study, as did the researcher in charge of running the analyses. However, due to the nature of the study, the participants could not be masked. The participants of both groups were able to participate freely in other activities during the intervention period, and continue participating in those that had previously started. The CONSORT guidelines were rigorously followed in this randomized clinical trial.

3.4.5 | Ethical considerations

An independent ethics committee, the ethics committee of clinical trials with medicines from Salamanca (Spain), approved the study on 30 September 2016. Written informed consent for the study was obtained from each study participant in accordance with the general recommendations of the Declaration of Helsinki (World Medical Association, 2013).

3.4.6 | Data analysis

Normality was assessed using Kolmogorov–Smirnoff normality test. Continuous variables are expressed as mean and standard deviation (*SD*)

or median and interquartile range (IQR). Comparisons between groups were performed using either the independent Student's *t* test or Mann–Whitney *U* test for parametric or for non-parametric sample distribution respectively. Categorical variables are expressed as number and percentages and the chi-squared test was used to compare both groups.

The effectiveness of the intervention was evaluated by comparing the differences experienced by the two groups before and 6 months after the intervention for each subject assigned to the intervention groups with respect to those assigned to the control group and based on the following expression: Effectiveness = [(Final mean – Baseline mean in the intervention group) – (Final mean – Baseline mean in the control group).

Analysis of the changes in the primary endpoint between the intervention group and the control group was carried out on an intent-to-treat basis (Lautenschlager et al., 2008). Following intent-to-treat principles, the participants were included regardless of the level of exposure to treatment (Gitlin et al., 2010). Cohen's *d* was calculated to measure effect size (Cohen, 1988).

A logistic regression model was used to analyse the probability of improvement or no improvement in DB (0 = no improvement and 1 = improvement) depending on sociodemographic factors. The independent variables were intervention (0 = control and 1 = intervention), caregiver gender (men = 1, women = 2), dependent gender (men = 1, women = 2), caregiver age, dependent age, kinship (son

or brother = 1 and husband/ wife or other relatives = 2), type of caregivers (relatives with dementia = 1 and relatives without dementia = 2) and number of months providing care. The statistical analyses were carried out using IBM® SPSS® v.25 software (IBM Corp, Armonk, NY).

4 | RESULTS

4.1 | Description of the participants

A total of 130 caregivers of care recipients participated in the study. Most were women (70.80%), with a mean age of 65.43 (*SD* 12.71) years and an average time of care of 11 years and 7 months, with care by children or siblings being more frequent (46.90%). Carers of people with dementia comprised 61.50% of the sample. Care recipients were mostly women (58.90%) and had an average age of 72.02 (*SD* 19.18) years. Table 2 shows the comparison between CG and IG baseline data.

4.2 | Outcomes and Estimation

Table 3 shows the effect of the intervention in each of the following tests: The RMBPC test yielded a net decrease in the DB frequency

TABLE 2 Comparison of control and intervention groups at baseline: caregivers and care recipients

	Total, N = 130	Control group, N = 81	Intervention group, N = 49	*p* value
Caregivers				
Age	65.50 (55.00–77.00)	64.00 (56.00–77.00)	66.00 (54.00–76.50)	0.717[b]
Gender, *n* (%)	92 (70.80)	57 (70.40)	35 (71.40)	0.531[a]
Kinship, *n* (%)				
Husband/Wife	41 (31.50)	21 (25.90)	20 (40.80)	0.126[a]
Son or brother	51 (46.90)	39 (48.10)	22 (44.90)	
Other relative	28 (21.50)	21 (25.90)	7 (14.30)	
Live with partner	107 (82.30)	66 (81.50)	41 (83.70)	0.473[a]
Years of studies	6 (6.00–8.00)	6 (6.00–8.00)	7 (5.00–8.00)	0.166[b]
Number of months providing care	72.00 (36.00–159.00)	84.00 (48.00–180.00)	48.00 (26.00–84.00)	0.002[b]
Type of caregivers				
Relatives with dementia	50 (38.50)	37 (45.70)	13 (26.50)	0.022[a]
Relatives without dementia	80 (61.50)	44 (54.30)	36 (73.50)	
	n = 115	*n* = 69	*n* = 46	
Care recipients				
Age	79.00 (59.00–86.00)	76.00 (51.00–86.00)	81.50 (70.75–89.00)	0.174[b]
Gender, *n* (%)	76 (58.90)	48 (59.30)	28 (58.30)	0.531[a]

[a]Assessed using chi-squared test.
[b]Assessed using *U* Mann–Whitney.

score of 3.78 and in the reaction to DB score of 4.54, with a global net decrease of 4.34 ($p < 0.01$ for all) and a global Cohen's d of 1. The overall net decrease on the GHQ test was 1.33 ($p = 0.185$), obtaining a global Cohen's d of 0.31. The CES-D test yielded a net decrease of 2.67 ($p = 0.008$) with a Cohen d of 0.50. Finally, in the short ZBI there was a net reduction in the score of 4.10 ($p < 0.001$) and a Cohen's d of 0.98.

Table 4 shows the distribution of participants presenting positive or negative changes in the RMBPC test between the initial and final assessment, both in frequency and reaction, and the overall measure. A net difference between the CG and the IG of 66.00% was found in the overall result: 32.90% of the CG had worsened, while in the IG, 33.10% showed improvement.

As Table 5 shows, the results of the logistic regression analysis demonstrate that the intervention was the only variable influencing the improvement (OR = 1.591, 95% CI = 1.959–12.298) of caregivers. The gender of caregiver and care recipient, their age and kinship and whether care recipients had dementia, did not seem to influence the results ($p > 0.05$ in all cases). To perform the logistic regression analysis, the kinship variable was divided into two categories (offspring or sibling = 1 and husband/wife or other relatives = 2).

5 | DISCUSSION

This study seeks to assess the effectiveness of an intervention based on the ABC model of functional behaviour analysis to reduce DB in ADCC users, and improving the emotional state of family caregivers and reducing their overload. This is, as far as we know, the first randomized and controlled clinical trial conducted with the specific objective intervening in the DB that appear in people attending ADCC through an intervention aimed at training the family caregiver in DB modification techniques. The intention was thus to reduce the appearance of the care recipient's DB, and their repercussions on the family caregiver.

The results obtained suggest that the implementation of this intervention reduces both the frequency of DB occurrence and the reaction of the caregiver to their appearance. The results also suggest that, if left untreated, DB are exacerbated over time. Improvement was also noted in the results regarding overload and emotional state of the family caregiver receiving the intervention, especially in depressive symptomatology as measured by the CES-D. However, depressive symptomatology is not the same as overall perceived mental health. Although in several studies the GHQ-12 has been proved as a consistent and reliable instrument in the assessment of the mental health of family caregivers (Cuellar-Flores et al., 2014), its usefulness to detect changes increases when it is repeated at long intervals, annually mainly (Pevalin, 2000).

Data from this study provide additional empirical support for the effectiveness of non-pharmacological interventions in reducing the distress of people with dementia and their caregivers (Cheng et al., 2020). From the nursing field specifically, different interventions have been carried out to modify caregiver overload and depression (Frias et al., 2020; Lee et al., 2020), factors that can positively affect quality of life (Oba et al., 2018). Although DB pose a great challenge, the results of this study contribute to evidence showing that they can be tackled (Williams et al., 2017; Wunner et al., 2020), in this case before a specific event such as assistance to the day centre. In line with the conclusions obtained in the meta-analysis by Cheng et al. (2020), the results of this study confirm that an intervention designed to address specific problems raised by caregivers (in this case, specific DB) provides adequate results in reducing the problems people face. Contrary to what is described in meta-analyses on interventions with caregivers (Pinquart & Sorensen, 2006), which reported the ineffectiveness of interventions to reduce caregiver overload, the results of this study suggest that focusing interventions on those problems which generate more stress for the caregiver can have a clinically and positively significant impact on their overload, as measured with the short ZBI (Gort et al., 2005).

TABLE 3 Comparison of control caregivers ($n = 81$) and intervention ($n = 49$) group: Baseline and postintervention

	Baseline, median (IQR)/mean (SD)		Post-intervention, median (IQR)/mean (SD)		Mean		
	Control group (N = 81)	Intervention group (N = 49)	Control group (N = 68)	Intervention group (N = 43)	Difference U/t	p value	Cohen d
RMBPC							
Frequency DB	6.00 (2.00–7.50)	6.00 (2.00–13.00)	9.00 (4.25–13.75)	2.00 (1.00–6.00)	−3.78	<0.01	0.93
Reaction DB	5.00 (2.00–8.00)	6.00 (2.25–11.75)	9.00 (4.25–14.00)	2.00 (0.00–8.00)	−4.54	<0.01	1.00
Global	10.00 (5.00–15.00)	13.00 (5.00–22.00)	18.50 (8.50–28.25)	5.00 (1.00–14.00)	−4.34	<0.01	1.00
GHQ-12	10.00 (9.00–15.00)	12.00 (9.00–14.00)	11.00 (8.00–14.00)	9.00 (8.00–13.75)	−1.33	0.185	0.31
CES-D	17.00 (13.00–24.00)	20.00 (14.00–29.50)	19.50 (11.00–29.25)	16.00 (7.00–29.75)	−2.67	0.008	0.50
Short ZBI	18.46 ± 7.14	20.03 ± 6.03	21.65 ± 7.42	19.00 ± 7.44	−4.10	<0.001	0.98

Note: Mann–Whitney U test is used to test differences in all measures excepting Short ZBI where Student's t is applied.

Abbreviations: CES-D, Center for Epidemiologic Studies Depression Scale; DB, Disruptive behaviors; GHQ-12, General Health Questionnaire; RMBPC, Revised Memory and Behavior Problems Checklist; Short ZBI, Short Zarit Burden Interview.

TABLE 4 Clinical significance of main outcomes at post-intervention in RMBPC

	Control group (N = 68)			Intervention group (N = 43)			
	Improved, N (%)	Worsened, N (%)	Net improvement	Improved, N (%)	Worsened, N (%)	Net improvement	Difference in net improvement (%)
RMBPC							
Frequency DB	23 (33.80)	45 (66.20)	−22 (−32.40)	28 (65.10)	15 (34.90)	13 (30.20)	62.60
Reaction DB	22 (32.40)	46 (67.60)	−24 (−35.20)	29 (67.40)	14 (32.60)	15 (34.80)	70.00
Global	21 (42.90)	47 (75.80)	−26 (−32.90)	28 (57.10)	15 (24.00)	13 (33.10)	66.00

Abbreviations: Frequency DB, Frequency of disruptive behaviours of the dependent person; Reaction DB, Degree to which the disruptive behaviours of the dependent person affect the caregiver; RMBPC, Revised Memory and Behavior Problems Checklist.

TABLE 5 Determinants in the improvement total of Disruptive Behaviours. Logistic Regression Analysis

	OR	Sig.	95% CI
Intervention	1.591	0.001	1.959–12.298
Caregiver gender	−0.091	0.861	0.329–2.529
Care recipient gender	−0.949	0.047	0.152–0.986
Caregiver age	−0.034	0.123	0.925–1.009
Care recipient age	0.013	0.526	0.973–1.055
Kinship	0.358	0.206	0.821–2.492
Type of caregiver	−0.264	0.733	0.168–3.499
Number of months providing care	0.002	0.269	0.999–1.005

Note: Dependent variable: improvement in total disruptive behaviours (0 = no improvement and 1 = improvement). Independent variable: Intervention (0 = control and 1 = intervention); Caregiver gender (men = 1 and women = 2); Care recipient gender (men = 1 and women = 2); Kinship (son or brother = 1 and husband/wife or other relative = 2); Type of caregiver (relatives with dementia = 1 and relatives without dementia = 2); Number of months providing care.

The results of this randomized and controlled study provide empirical support for the pilot intervention described by Nogales-Gonzalez et al. (2014). While the intervention described in this study was originally designed to be implemented with caregivers of dementia sufferers (Nogales-Gonzalez et al., 2014), the present results suggest that the effectiveness of the proposed intervention is also likely in caregivers of care recipient with other disorders. This corroborates the idea proposed by Pinquart and Sorensen (2003) that the greatest stress factor for the caregiver is not so much related to cognitive problems or physical limitations, but rather the appearance of DB in the care situation.

ADCCs provide an important respite service for the caregiver (Manthorpe & Moriarty, 2014) and the availability of an intervention to tackle the great limitation posed by DB appearing in ADCC users is an important resource to offer families even before their dependant is admitted, so that they have the necessary knowledge to deal correctly with such resistance from the day their relative first displays it. Caregivers need adequate understanding and interpretation of symptoms to adjust how they handle them (Gilmore-Bykovskyi et al., 2019). It is also important to know their individual self-reported experience for the quality of long-term care (Haex et al., 2020). Similarly, Ray et al. (2015) indicate that it is the change

in the social environment of the dependent person, not just the physical environment, which creates a negative impact when there is a change in the system of care. Therefore, they highlight how important it is for the caregivers to participate in the process and in providing support during their family member's adaptation to the ADCC, promoting dialogue to find common ground in the different alternatives (Mengelers et al., 2019).

The intervention is one where caregivers can participate without any restrictions. In addition, we can conclude that it is effective regardless of factors such as age, gender, kinship or type of care recipient disorder. For this reason, the intervention may be recommended to caregivers who plan to start taking their relatives to an ADCC, and to all those families that already have a person in a situation of dependency in an ADCC.

5.1 | Limitations

The dropout rate in this study was 12%. However, the dropout rate of the intervention was similar and even lower to the one reported in an individualized intervention for dementia family caregivers (Marquez-Gonzalez et al., 2020). This finding provides support to the importance of targeting problems that are relevant for each caregiver through individualized interventions such as the one reported here. In addition, it was not possible to mask participants due to the nature of the intervention. The sample's kinship distribution indicates that the percentage of participants who were other relatives or parents was higher than usual in caregiver studies and, in addition, the distribution showed differences between CG and IG. Since the evaluation time was immediate and the observation of the results of the intervention was made only one time 6 months after the baseline evaluation, it cannot be discriminated whether the effect on self-perceived mental health may be due to the percived support during the intervention or the intervention itself. Therefore, it would be necessary to carry out a study about the length of the intervention's effect over time. On the other hand, there are few studies that analyse the RMBPC test as outcome, so it is not easy to compare the data from our study with others. However, due to the consistency of the results provided by this questionnaire, it leads us to recommend its use as one of the most appropriate tools in intervention trials on family

caregivers (Drummond et al., 2019). Therefore, future studies are necessary to confirm the usefulness of the intervention described in day centres and to obtain support as to whether the characteristics of this study, and its results, are generalizable to the caregiver population using ADCCs.

6 | CONCLUSION

The results suggest that the intervention described is associated with reductions in both the frequency of DB in ADCC users and the reaction of caregivers to their appearance, and the reduction of caregiver distress as measured by different stress and mental health indicators. Research and theoretical development are important as evidenced by different interpretations and publications, which show the tendency to develop specific knowledge and competence of nursing in care centres (Nybakken et al., 2018). Given the usefulness of ADCCs in providing respite for caregivers by facilitating continued caring at home, the implementation of such interventions in these settings should be considered so that they may be offered as a resource to the millions of families suffering high levels of care-related distress.

CONFLICTS OF INTEREST
No conflict of interest was declared by the author(s).

AUTHOR CONTRIBUTIONS
All authors have agreed on the final version and meet at least one of the following criteria [recommended by the ICMJE; http://www.icmje.org/recommendations/): (1) substantial contributions to conception and design, acquisition of data or analysis and interpretation of data; (2) drafting the article or revising it critically for important intellectual content.

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