

Physical and social environment in the occupational therapeutic intervention process for elderly with Alzheimer's disease and their caregivers: a systematic review of the literature

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Abstract: Introduction: Alzheimer's disease has a significant impact on patients and their families. The restriction on participation is understood in its totality only if considered the context and environment in which the activities happen. In occupational therapeutic intervention, the actions aimed to the environment have been effective in engaging the elderly in significant occupations. Objective: Analyze the intervention process directed to the physical and social environment of the elderly with Alzheimer's disease. Method: A systematic review was conducted, in a 10-year period (2006-2015), in English, Portuguese, and Spanish. The Web of Science, MEDLINE / PubMed, CINAHL, PsycINFO®, LILACS, SciELO, OTSeeker, and PEDro databases were used as sources of information. The inclusion criteria were selected for deeper analysis: scientific publications related to Alzheimer's disease in elderly with the participation of at least one occupational therapist as an author and that considered the environmental interventions, or to discuss occupational therapy in Alzheimer's disease without restrictions on the stage of the disease. Results: A total of 141 articles were found, of which only 9 met the selection criteria. National and international studies have shown close association of these interventions with the patient's functionality, humor and quality of life of the dyad, better sense of competence among caregivers, less burden of work, and better cost-effectiveness. Conclusion: Occupational therapy, through environmental modification and educational actions, promotes improvement in the quality of life of the dyad.

Keywords: *Occupational Therapy, Alzheimer Disease, Aged, Environment, Systematic Review.*

Ambiente físico e social no processo de intervenção terapêutico ocupacional para idosos com Doença de Alzheimer e seus cuidadores: uma revisão sistemática da literatura

Resumo: Introdução: A Doença de Alzheimer (DA) tem um impacto significativo sobre o idoso e seus familiares. A restrição na participação só é compreendida, em sua totalidade, se forem considerados o contexto e o ambiente em que as atividades acontecem. Na intervenção terapêutica ocupacional, as ações direcionadas ao ambiente têm se mostrado eficazes no engajamento do idoso em ocupações significativas. Objetivo: Analisar o processo de intervenção direcionado ao ambiente físico e social dos idosos com DA. Método: Foi realizada revisão sistemática da literatura por um período de 10 anos (2006 a 2015), nos idiomas inglês, português e espanhol. Optou-se pela busca nas seguintes fontes de informação: Web of Science, MEDLINE/PubMed, CINAHL, PsycINFO®, LILACS, SciELO, OTseeker e PEDro. Os critérios de inclusão adotados foram: publicações científicas relacionadas a DA em idosos, que abordem as intervenções ambientais e que tenham participação de terapeuta ocupacional na autoria, sem se restringir à fase



da doença. Resultados: Foi localizado um total de 141 artigos, sendo que apenas nove atenderam aos critérios de seleção. Os estudos apresentaram estreita associação dessas intervenções com a funcionalidade do paciente, o humor e a qualidade de vida da diáde, melhor senso de competência entre os cuidadores, menor sobrecarga de trabalho, além de melhor custo-efetividade. Conclusão: A terapia ocupacional, por meio de modificação ambiental e ações educativas, promove melhoria na qualidade de vida da diáde.

Palavras-chave: *Terapia Ocupacional, Doença de Alzheimer, Idoso, Meio Ambiente, Revisão Sistemática.*

1 Introduction

Alzheimer's disease and other related dementias affect the elderly in general and are considered a priority for public health since 2012 (DUTHEY, 2013; WORLD..., 2012). In 2015, the World Health Organization has declared an estimated 47 million people worldwide with dementia (WORLD..., 2015) and studies point to the scenario of a prospective increase (BURLÁ et al., 2013; ALZHEIMER'S..., 2014).

For a long time, these people are under dependency of the health system and under the care of formal family or caregivers, as they present impairment in cognitive functions and/or neuropsychiatric alterations as characteristics, with impairment of independence and autonomy to perform the activities of their daily life (GITLIN; CORCORAN, 2005; PADILLA, 2011a; SCHABER; LIEBERMAN, 2010).

The activities performed in their routines should be understood within a context and environment. In the gerontology area, the environment is one of the factors that facilitate or limit the functionality of the elderly and their participation in occupations that are significant to them (CASSIANO, 2008; MARTINEZ; EMMEL, 2013).

In the occupational therapist's understanding, occupational performance occurs within a physical and social environment, situated in a context. The physical environment includes constructed and natural aspects, and the objects in it, such as buildings, furniture, terrains, tools, and plants (BROWN, 2011). On the other hand, the social environment is composed of interpersonal relationships - people with whom the individual has the closest contact (in the case of the elderly with Alzheimer's disease: the primary caregiver, family and friends) - and also system relationships (political, legal, economic) that influence daily life (AMERICAN..., 2014). In the approach to this elderly, environmental interventions include changes in the environment, education or training programs for the caregiver, and access to community resources (SCHABER; LIEBERMAN, 2010).

As far as foreign and national publications are concerned, most of the scientific production related to Alzheimer's disease is focused on research on the clinical aspects of the disease and focuses on diagnoses (RODRIGUES; GONTIJO, 2009). Studies aimed at non-pharmacological interventions - including the occupational therapeutic process - are still incipient in Brazil and have a higher quantitative value in other countries. These facts justify the production of systematic reviews. In this context, through this methodology, this article aims to contribute to the understanding about the process of occupational therapeutic intervention directed to the physical and social environment of the elderly with Alzheimer's Disease (AD). The guiding question for the search for productions was: How do the environmental interventions promoted by occupational therapists have repercussions on the daily life of the elderly with AD?

2 Methods

It is a systematic review of the literature of the integrative type, since it selects and critically analyzes the existing products on a certain question investigated, and leads to the construction of a theoretical platform on the subject (MARCONI; LAKATOS, 2009; SOARES et al., 2014).

In this investigation, the national and international scientific productions were considered, evidencing the actions developed by the occupational therapist directed to the physical and social environments of the elderly with Alzheimer's Disease. The time cut was 10 years (January 2006 to December 2015). The selected sources of information were Scopus, Web of Science, MEDLINE/PubMed (via National Library of Medicine), Cumulative Index to Nursing and Allied Health Literature (CINAHL), PsycINFO®, Latin American and Caribbean Literature in Health Sciences (LILACS), Scientific Electronic Library on Line (SciELO), Occupational Therapy Systematic Evaluation of Evidence (OTseeker) and Physiotherapy Evidence Database (PEDro).

Regardless of the free access to the publications as inclusion criteria, the following articles were

considered: 1) to address Alzheimer's disease in the elderly; 2) to have occupational therapist participation in the authorship or that deal with occupational therapy; 3) to focus on environmental interventions; 4) to not be restricted to the particular stage of the disease; 5) to refer to the elderly with Alzheimer's Disease, regardless of the time in which they are undergoing occupational therapy, and 6) to be in Portuguese, English or Spanish. These terms "Alzheimer's Disease", "environment" and "Occupational Therapy" were located in the title, abstract and/or keywords of the records found. Productions were excluded when: 1) addressed other interventions not directed to environments; 2) used the literature review as study design; 3) referred to the elderly with other types of dementia or other pathologies; 4) approached AD in people younger than 60 years old. Also, the abstracts of congresses, annals, editorials and previous notes were not included because, often, these items did not contain the complete work.

The Health Sciences Descriptors (DeCS) were consulted to define the search terms. The following descriptors were stipulated: "behavior", "environment", "caregivers" and "cognition", combined with "Alzheimer's Disease" and "Occupational Therapy" using the Boolean operators AND and OR. Expressions were also used in English and Spanish. The terms "cognition" and "behavior" were selected to identify articles that were focused on reducing cognitive function and/or neuropsychiatric disorders, respectively, and which could be the subject of environmental interventions.

The constructed strategies and search expressions with results are presented in Table 1.

The identified papers were exported to the online EndNote® Web software for storage and organization, initiating the process of selecting the search corpus, which is presented in Figure 1.

The total number of documents identified was 141. After the selected articles were reading in full, nine articles were selected for the research. There were 28 of the 132 excluded articles eliminated by the methodology used; 65 were publications that did not involve intervention in the environment; 30 did not focus on the elderly with AD and/or on OT's performance; five articles did not include the pre-selected languages and four did not refer to the full article.

Subsequently, a form was created to organize the results. They were then subjected to a thematic categorization process. The articles were analyzed considering the authorship, the year of publication, the journals used, the objectives of the studies, the methodological designs, the occupational therapy actions, the outcomes, the recommendations or the conclusions of the studies.

3 Results and Discussion

The research consists of nine articles that are characterized in Table 2, according to title, authorship, year of publication, study site and journal in which it was published.

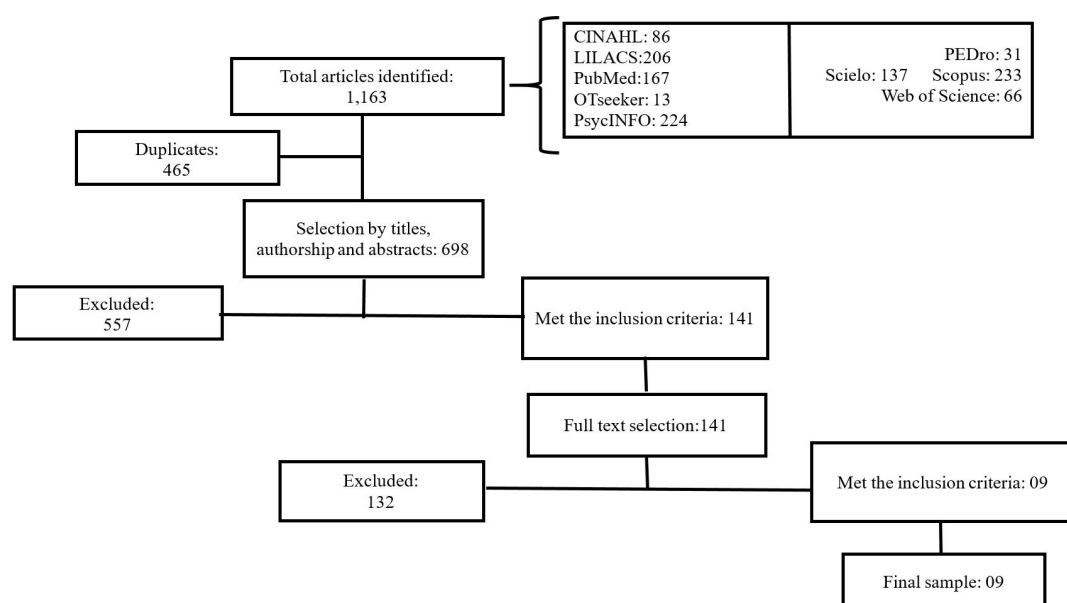


Figure 1. Flow of the selection process. Source: The authors, 2016.

Table 1. Sources of information, search expressions and results of identified documents.

Information sources	Search Expressions	Result
CINAHL with Full Text (EBSCO)	("occupational therapy" OR "Occupational therapy/methods") AND ("Alzheimer" OR "Alzheimer disease" OR "Alzheimer's disease") AND ("behavior" OR "environment" OR "cognition" OR "occupation" OR "activities" OR "social support" OR "caregivers")	86
LILACS	"Alzheimer" [Palavras] and "occupational therapy" [Palavras] OR "Behavior" [Palavras] and "Alzheimer disease" [Palavras] OR "environment" [Palavras] and "Alzheimer disease" [Palavras] OR "caregivers" [Palavras] and "Alzheimer disease" [Palavras]	206
MEDLINE/PubMed (via National Library of Medicine)	("occupational therapy" [All Fields] OR "Occupational therapy/methods"[All Fields]) AND ("Alzheimer"[All Fields] OR "Alzheimer disease"[All Fields] OR "Alzheimer's disease"[All Fields]) AND ("behavior" [All Fields] OR "environment" [All Fields] OR "cognition" [All Fields] OR "occupation" [All Fields] OR "activities" [All Fields] OR "caregivers" [All Fields] OR "social support" [All Fields])	167
O'tseeker	("occupational therapy" OR "Occupational therapy/methods") AND ("Alzheimer" OR "Alzheimer disease" OR "Alzheimer's disease") AND ("behavior" OR "environment" OR "cognition" OR "occupation" OR "activities" OR "social support" OR "caregivers")	13
PsycINFO	Any Field: "occupational therapy" OR "Occupational therapy/methods" AND Any Field: "Alzheimer" OR "Alzheimer disease" OR "Alzheimer's disease" AND Any Field: "behavior" OR "environment" OR "cognition" OR "occupation" OR "activities" OR "social support" OR "caregivers"	224
PEDro	"Alzheimer" OR "dementia"	31
Scielo Citation Index	Tópico: (occupational therapy) AND Tópico: (Alzheimer disease) OR Tópico: (behavior) AND Tópico: (Alzheimer disease) OR Tópico: (environment) AND Tópico: (Alzheimer disease) OR Tópico: (caregivers) AND Tópico: (Alzheimer disease)	137
Scopus	TITLE-ABS-KEY ("Occupational Therapy" OR "Occupational therapy/methods") AND TITLE-ABS-KEY ("behavior" OR "environment" OR "cognition" OR "occupation" OR "activities" OR "social support" OR "CAREGIVERS") AND TITLE-ABS-KEY ("Alzheimer" OR "Alzheimer disease" OR "Alzheimer's disease")	233
Web of Science	Tópico: ("occupational therapy" OR "Occupational therapy/methods") AND Tópico: ("Alzheimer" OR "Alzheimer disease" OR "Alzheimer's disease") AND Tópico: ("behavior" OR "environment" OR "cognition" OR "occupation" OR "activities" OR "social support" OR "caregivers")	66
Total Article Search		1,163

Source: The authors, 2016.

Table 2. Occupational Therapeutic Interventions Targeting Environments.

N°	AUTHORS	OBJECTIVES	METHODOLOGICAL DESIGN	RESOURCES USED	OUTCOMES	LIMITATIONS OF THE STUDY
01	Graff et al. (2007)	To verify that intervention improves mood, quality of life, health status, and sense and control over the lives of these patients and their informal caregivers.	Randomized Clinical Trial. Participants: 135 dyads. In the follow-up: 105 dyads. Intervention group: OT. Control group: without OT. Outcome measures: COPM, OPHI-II, DQoL, GHQ-12, CSD, CES-D, Mastery Scale	Environmental modifications to adapt ADLs. Cognitive and behavioral interventions Caregiver Orientation	1) Patients and caregivers who received OT improved significantly compared to the start of treatment, regarding overall quality of life, health status, and mood. 2) At the follow-up, the results of the intervention group remain better than the control group. 3) Strong association between daily functioning of the patient, mood, and quality of life in the caregivers' sense of control over life.	It is not possible to conduct a double-blind study (convenience sample). The sample may not be representative of all types of patients in the region.
02	Graff et al. (2008)	To evaluate the cost-effectiveness of an OT service in the community compared to the usual care for elderly people with dementia and their caregivers.	Randomized Clinical Trial. Participants: 132 dyads. Intervention group: 10 sessions (1 hour) of OT at home for 5 weeks Control group: no OT. Outcome measures: CIRS-G, RMBPC, AMPS, IDDD, Cornell SCQ Depression Scale, CES-D	Environmental modifications to adapt ADL. Cognitive and behavioral interventions Caregiver Orientation Cost-effectiveness: daily expenses	1) Costs to visit doctors and hospitals were the same in the groups. The costs of home care, social work, physiotherapy, day-care use and meal delivery were all lower in the intervention group, as well as hospital admission and in homecare institutions. 2) Average saving of 1,748 euros per dyad of the intervention group, in the period of 3 months.	Not compared to other types of treatment. The sample may not be representative.

Captions: AMPS: Assessment of Motor and Process Skills Process Scale; BSFC: The 28-item Burden Scale for Family Caregivers; CAPE-BRS: Clifton Assessment procedures for the elderly – Behaviour Rating Scale; CBS: Challenging Behaviour Scale; CCS: Caregiver Competence Scale; CDR: Clinical Dementia Rating Scale; CES-D: Center for Epidemiological Studies - Depression; CIRS-G: Cumulative Illness Rating Scale for Geriatrics; COPM: Canadian Occupational Performance Measure; CSD: Cornell Scale for Depression; DQoL: Dementia Quality of Life Instrument; GHQ-12: General Health Questionnaire; IDDD: Interview for Deterioration in Daily Living Activities in Dementia; KI-ADL: Índice de Katz – ADL; MEEIM: Mini-Exame do Estado Mental; MSPSS: Multidimensional Scale of Perceived Social Support; OARS: Multidimensional Functional Assessment Questionnaire; OPHI-II: Occupational Performance History Interview – II; PAC: Positive Aspects of Caregiving; PRPP: Perceived Recall, Plan, Perform System of Task Analysis; QoL-AD: Quality of Life - Alzheimer's Disease Measure; RMBPC: Revised Memory and Behavior Problems Checklist; SCQ: Sense of Competence Questionnaire; SF-12: Short Form Health Status. Source: The authors, 2016.

Table 2. Continued...

Nº	AUTHORS	OBJECTIVES	METHODOLOGICAL DESIGN	RESOURCES USED	OUTCOMES	LIMITATIONS OF THE STUDY
03	Chiu et al. (2009)	To explore the reliability and usability of an Internet-based caregiver support service (ICSS), and to evaluate the effect of caregiver participation on health.	Longitudinal descriptive and in-depth interviews Participants: 28 Chinese caregivers living in Canada. Outcome measures: BSFC, RMBPC, CES-D Self Rated Health, MSPSS, PAC, OARS CCS	Use of the online program to guide about dementia	1) Usability of ICSS: Chinese prefer to talk and receive information in Chinese, but send email in English. 2) The elderly had a better perception of competence to care for the elderly, but this was associated with less use of the online program (forgetting the login and password). 3) Perception about care is cultural. 4) Stress relief after online support.	Sample of convenience. Support is not aimed at caregivers who do not speak Mandarin. There was no analysis of the content of the emails.
04	Donovan and Corcoran (2010)	Descrver como os cuidadores agem, pensam e conduzem seus cuidados. To describe how caregivers act, think and manage their care.	Type of study: Qualitative research. Participants: 15 informal caregivers.	Educational actions	1) Positive behaviors: simplify and organize routine, exercise or rest, hobbies, humor, engage with family, colleagues and caregivers, support in religion, kipping a conversation.	Secondary data used. It does not have racial diversity in the analyzed group.
05	Oliveira-Assis et al. (2010)	To test the effectiveness of external aid resources. To evaluate the develop technologies, appropriateness and usefulness of the resources by a group of professional occupational therapists.	Type of study: Case study. Carer's reports were analyzed. Participants: For product efficacy: 1 dyad. Frequency: 2 x in the week, 50-minute sessions for 4 months. To evaluate the resources: 7 OT specialists in gerontology. Outcome measures: MEEEM, Verbal Fluency Test, Clock Test, KI-ADL	Environmental modification: calendar and nameplates of the rooms. Modification of activities: Activity board and routine organizer. For training of the cognitive domains: activity table and Geriatric Software	1) Environmental changes led to an increase in the aspect of time orientation. 2) The caregiver states that the elderly are more communicative and able to keep a conversation. 3) Wife reports qualitative improvements in bathing activities, toilet use and continence (initiative and agility). 4) There was decline in aggressive behavior. 5) In the evaluation of resources: OT point the software as useful, with capacity to adapt and motivate the interest of the patient. 6) Improvement of resources: they are focused on the type of material and the transportation.	It did not include measures of elderly satisfaction and caregiver overload. He did not do the experimental design. Because it is a case study, the data cannot be generalized.

Captions: AMPS: Assessment of Motor and Process Skills Process Scale; BSFC: The 28-item Burden Scale for Family Caregivers; CAPE-BRS: Clifton Assessment procedures for the elderly – Behaviour Rating Scale; CBS: Challenging Behaviour Scale; CCS: Caregiver Competence Scale; CDR: Clinical Dementia Rating Scale - versus Chronic Care; CES-D: Center for Epidemiological Studies - Depression; CIRS-G: Cumulative Illness Rating Scale for Geriatrics; COPM: Canadian Occupational Performance Measure; CSD: Cornell Scale for Depression; DQoL: Dementia Quality of Life Instrument; GHQ-12: General Health Questionnaire; IDDD: Interview for Deterioration in Daily Living Activities in Dementia; KI-ADL: Indice de Katz - ADL; MEEEM: Mini-Exame do Estado Mental; MSPSS: Multidimensional Scale of Perceived Social Support; OARS: Multidimensional Functional Assessment Questionnaire; OPHI-II: Occupational Performance History Interview - II; PAC: Positive Aspects of Caregiving; PRPP: Perceived Recall, Plan, Perform System of Task Analysis; QOL-AD: Quality of Life - Alzheimer's Disease Measure; RMBPC: Revised Memory and Behavior Problems Checklist; SCQ: Sense of Competence Questionnaire; SF-12: Short Form Health Status. Source: The authors, 2016.

Table 2. Continued...

Nº	AUTHORS	OBJECTIVES	METHODOLOGICAL DESIGN	RESOURCES USED	OUTCOMES	LIMITATIONS OF THE STUDY
06	Cunha et al. (2011)	<p>Descrver os resultados da intervenção domiciliar de terapia ocupacional associada ao tratamento medicamentoso, em um idoso com DA em fase avançada.</p> <p>To describe the results of home care of occupational therapy associated with drug treatment in an elderly patient with advanced stage of AD.</p>	<p>Type of study: Case study.</p> <p>Participant: an elderly person with advanced AD and his/her caregiver. Frequency: 3 x in the week, for 8 months.</p> <p>Outcome measures: MEEM, Verbal fluency test, Clock test, KI-ADL, COPM, Time Diary</p>	<p>Environmental Modification, Cognitive Stimulation Techniques, Walking, Senior Dance, and Caregiver Education</p>	<p>1) Sustained increase in MEEM (contrary to literature), clock (slight improvement) and verbal fluency (important gain).</p> <p>2) Maintenance of gains for 5 months after intervention.</p> <p>3) OT and drug therapy promote a positive impact on the caregiver, reducing the functional dependence of the elderly and promoting the temporary stabilization of the disease, despite the progressive nature of the disease.</p>	<p>To be a case study.</p> <p>Generalization of data cannot occur.</p>
07	Voigt-Radloff et al. (2011)	<p>To compare the benefits and harms of the 10 sessions of Community Occupational Therapy (DAT) program in Dutch patients with AD, and the impact of a consultation session in German health centers (COTC).</p>	<p>Type of study: Randomized clinical trial.</p> <p>Participants: 104 elderly and their caregivers.</p> <p>Intervention group: 54 dyads</p> <p>Frequency: 1 x, 1 h, 5 wks.</p> <p>Control Group: 50 dyads.</p> <p>Frequency: 1 x for 30 min</p> <p>Follow-up: 6th, 16th, 26th, 52nd week.</p> <p>Outcome measures: IDDD; PRPP, SF-12, Dementia Quality of Life Instrument.</p>	<p>In the Netherlands: adaptation, simplification, caregiver education.</p> <p>Control group (in Germany): one hour consulting with a one-page booklet.</p>	<p>1) The daily functioning of the patients did not present significant changes during the 26 weeks, in neither of the two groups.</p> <p>2) There was no greater benefit of the DOTC compared to the COTC.</p> <p>3) In both groups, the need for ADL and IADL assistance remained stable for 6 months after the start of the research.</p> <p>4) There was no significant difference in quality of life, mood, patient's inability to perform ADL, sense of competence of the caregiver, daily hours of care and place of residence of the caregiver.</p>	<p>Small sample size that limits the validity of the results.</p> <p>Comparison between two different cultures.</p> <p>Used in Germany the material that was produced by the Netherlands.</p>

Captions: AMPS: Assessment of Motor and Process Skills Process Scale; BSFC: The 28-item Burden Scale for Family Caregivers; CAPE-BRS: Clifton Assessment procedures for the elderly – Behaviour Rating Scale; CBS: Challenging Behaviour Scale; CCS: Caregiver Competence Scale; CDR: Clinical Dementia Rating Scale - versão Chronic Care; CES-D: Center for Epidemiological Studies - Depression; CIRS-G: Cumulative Illness Rating Scale for Geriatrics; COPM: Canadian Occupational Performance Measure; CSD: Cornell Scale for Depression; DQoL: Dementia Quality of Life Instrument; GHQ-12: General Health Questionnaire; IDDD: Interview for Deterioration in Daily Living Activities in Dementia; KI-ADL: Índice de Katz – ADL; MEEM: Mini-Exame do Estado Mental; MSPSS: Multidimensional Scale of Perceived Social Support; OARS: Multidimensional Functional Assessment Questionnaire; OPHI-II: Occupational Performance History Interview – II; PAC: Positive Aspects of caregiving; PRPP: Perceived Recall, Plan, Perform System of Task Analysis; QOL-AD: Quality of Life - Alzheimer's Disease Measure; RMBPC: Revised Memory and Behavior Problems Checklist; SCQ: Sense of Competence Questionnaire; SF-12: Short Form Health Status. Source: The authors, 2016.

Table 2. Continued...

Nº	AUTHORS	OBJECTIVES	METHODOLOGICAL DESIGN	RESOURCES USED	OUTCOMES	LIMITATIONS OF THE STUDY
08	Piersol, Earland and Herge (2012)	To guide on strategies to deal with Alzheimer's, showing that changes in the physical and social environment lead to the reduction of behavioral disorders.	Type of study: Case study. Participant: Caregiver, daughter of an elderly woman with AD. Aggressive and resistant patient to perform the activities. Outcome measures: based on the caregiver's reports.	Modifications in the social environment: conducting communication and how to do it. Routine structuring, use of assistive products	1) Stressful antecedents: give lots of tips, talk all the time, hasten your mother to take a shower, harsh tone in speech 2) After: changes smoothed the morning routine and increased participation of the elderly in self-care activities. 3) The care given to the elderly has become less painful and more manageable.	Single case study
09	Wenborn et al. (2013)	To evaluate the effectiveness of an OT program to train nursing staff in order to make them able to increase the activity and participation in ADL of residents with dementia	Type of study: Randomized clinical trial. Participants: Intervention group: staffs of 80 elderly people received the OT program. Control group: 70 elderly people who received the usual care. Follow-up for 8 weeks and follow-up was done at 4 and 12 weeks post-intervention. Outcome measures: QOL-AD, CAPE-BRS, CBS, CSD, Rating Anxiety in Dementia, CDR, Pool Activity Level Checklist	Educational actions, individual attendance, and evaluation of the physical environment (individual and group).	1) In the intervention group, 2 institutions had poor adherents, 4 fair and 2 good. 2) There was no significant difference in the adherence of staffs in different nursing homes, neither in the study period nor in the follow-up. 3) Even with positive staff feedback, there was no evidence that the intervention group had improvements to increase activity and participation, relative to control. 4) For the staff of the intervention group, they report that the quality of life of the residents with AD decreased when evaluated at the follow-up, in relation to the control group.	Variability of asylum adherence and lack of planning of the administrative sector to make staff available in the program. Not having done with more severe elderly, which decreases the capacity of engagement and social participation.

Captions: AMPS: Assessment of Motor and Process Skills Process Scale; BSFC: The 28-item Burden Scale for Family Caregivers; CAPE-BRS: Clifton Assessment procedures for the elderly - Behaviour Rating Scale; CBS: Challenging Behaviour Scale; CCS: Caregiver Competence Scale; CDR: Clinical Dementia Rating Scale - versus Chronic Care; CES-D: Center for Epidemiological Studies - Depression; CIRS-G: Cumulative Illness Rating Scale for Geriatrics; COPM: Canadian Occupational Performance Measure; CSD: Cornell Scale for Depression; DQoL: Dementia Quality of Life Instrument; GHQ-12: General Health Questionnaire; IDDD: Interview for Deterioration in Daily Living Activities in Dementia; KI-ADL: Índice de Katz - ADL; MEEM: Mini-Exame do Estado Mental; MSPSS: Multidimensional Scale of Perceived Social Support; OARS: Multidimensional Functional Assessment Questionnaire; OPHI-II: Occupational Performance History Interview - II; PAC: Positive Aspects of Caregiving; PRPP: Perceived Recall, Plan, Perform System of Task Analysis; QOL-AD: Quality of Life - Alzheimer's Disease Measure; RMBPC: Revised Memory and Behavior Problems Checklist; SCCQ: Sense of Competence Questionnaire; SF-12: Short Form Health Status. Source: The authors, 2016.

Regarding the corpus of the research, there is a balance in the published years, with five articles (55.6%) coming from the first five years of the temporal cut (2006 to 2010) and four articles (44.4%) of the last five years. All publications had the occupational therapist (OT) in the main authorship. Only two publications are national (22.2%) and the rest come from North America (USA and Canada) as well as from countries in Europe and one from the United Kingdom.

The methodology adopted in the national articles hinders to compare these studies with the interventions carried out abroad since they are case studies. According to evidence levels and degrees of recommendation of evidence-based medicine adopted by Medeiros and Stein (2002), the case studies do not generate outcomes that could affirm that the intervention adopted in the research can be generalized to the general population with the same health condition, because they contain a small number of participants. Thus, the generalization of the data is not recommended (MEDEIROS; STEIN, 2002). In contrast, the types of international studies found in this review were conducted to generate better scientific evidence.

In this integrative review, three articles (studies 01, 06, 07) referred to the use of both environmental modifications and guidance to caregivers as resources for intervention. The remaining articles focus exclusively on environmental modifications (studies 02, 05 and 08) or for education/training programs for the caregiver (studies 03, 04 and 09). No publication was identified focused on access to community resources.

With focus on studies aimed at environmental modifications, three articles were of randomized clinical trial type (01, 02 and 07). This type of study design has a level 1 scientific evidence, that is, the recommendations for its use in clinical practice are strong (MEDEIROS; STEIN, 2002).

The study by Graff et al. (2007) (nº 01) shows strong evidence for the implementation of environmental modifications and a caregiver orientation program, with close association of these interventions with the patient's functionality, mood, and quality of life, as well as a better sense of competence among caregivers.

Reductions in caregiver overload were also observed. Increased engagement in the daily activities of the elderly and reduced caregiving are also presented in other studies of lower level of scientific evidence (level 4 of scientific evidence) (at 06 and 08).

The same team of researchers, conducted by Graff in 2008 (nº 02), evaluated the cost-effectiveness of the intervention groups that received the occupational therapy service (environmental modifications and education to caregivers) and compared them to the group without therapeutic intervention occupational (control). Costs for visits to doctors and hospitals were equivalent between the two groups, but costs with other services, such as social work, physical therapy, daycare and hospital admission were lower in the intervention group. The economic evaluation showed that the approach adopted was more cost-effective during the three months of evaluation, reinforcing the benefits of these interventions aimed at environments.

The case study proposed by Oliveira-Assis et al. (2010) (nº 05) uses the identification of the rooms of the house and the calendar as an environmental modification, so the patient can be orientated in time and space. After the intervention, the caregiver reports better temporal and spatial orientation, as well as the control of the aggressive behavior of the demented elderly. These strategies also contributed to the reduction of the caregiver's overload.

The literature shows that changes in the environment (physical or social) occur when there is a need to reduce the cognitive demands to optimize the success in performing activities. As an example, kitchen drawers can be labeled to assist in the location of utensils (physical environment) or family members can give insights to the elderly with dementia and optimize the location of objects (social environment) (RADOMSKI; DAVIS, 2013).

The simple modifications in the home environment can contribute to increase the abilities of the elderly patients and reduce the occurrence of inappropriate behaviors, as well as to reduce the care provided by the caregiver and, consequently, to minimize the wear and overload of the family members (THINNES; PADILLA, 2011).

Also, simplifications of action steps, routines structuring and habit sequences can be made for a greater participation of the elderly in the task and to promote a sense of competence. In addition, there is the withdrawal of distractors (connected television, noisy environment) and the organization of space as other forms of modification that contribute to engagement in occupations.

In the systematic review carried out by Padilla (2011b), the most effective compensatory strategies were visual cues, direction signs, designs and labels in cabinets. Some assistive technology products are also used to support the task complementation, but care is

taken not to drastically modify the environment, so as not to cause confusion or agitation in the patient (PADILLA, 2011b). In patients residing in long-term care facilities for the elderly, placing photos on the doors of the rooms - as a strategy for the patient to orient himself in space - has produced a decrease in anxiety and agitation (PADILLA, 2011c).

To determine what modifications are necessary for the elderly with Alzheimer's disease, it is necessary for the professional to analyze the physical and social environment to identify what already exists in these areas and that can be used, as well as what needs to be created, to structure the dementing routine. In this sense, the aim is to promote, for a long time, autonomy and independence during the activities that are significant (ASSIS; ASSIS; CARDOSO, 2013).

With the evolution of the disease, the structure of the routine should be adjusted in the activities as well as in the schedules and frequencies, besides needing more changes in the external environment (ASSIS; ASSIS; CARDOSO, 2013). According to Anjos and Regolin (2012), external aids used with patients are schedules, using cell phones, speed dialing on phones, timers, digital clocks, sound alarms, alarm clocks, notebooks, lists, reminders, calendars, pictures, pill boxes, electronic organizers, electronic voice devices, and computers.

These products seek to compensate for deficiencies and to achieve satisfactory performance in activities, and they are considered resources that are part of the so-called Assistive Technology for Cognition (ANJOS; REGOLIN, 2012). The choice of what assistive product will be used should consider the socioeconomic conditions of the elderly, educational level, habits, motivation and cognitive ability (ASSIS; ASSIS; CARDOSO, 2013).

Anjos and Regolin (2012) report that low and medium-technology products - cell phones, stopwatches, electronic address books - are highly accepted as they are easy to acquire and use and can be programmed to operate at predetermined times. However, there are limitations on the amount of information that can be stored. Because patients with Alzheimer's disease may have difficulty initiating activities, the resources that have alarms would be more efficient.

Radomski and Davis (2013) reinforce that pre-programmable memory aid devices are more efficient for the task to be performed at the specified time compared to written lists or reminders, which do not tell the exact time to perform the activity. It is important to highlight that these strategies

benefit the elderly who are in the early stages of dementia since they still have a residual capacity for new learning. Thus, competencies are acquired to deal with these compensatory strategies, preserving their function for longer and reducing the impact of dementia in the daily routine (SOARES; SOARES; CAIXETA, 2012).

Even with several notes on the benefits of modifications in the environment and context, the study by Voigt-Radloff et al. (2011) (n° 07), which compares 10 occupational therapy sessions (environmental modifications, simplification of activities and orientation to caregivers) in elderly with Dutch AD with a consultation session for German elderly people, points to different results. In the consultancies made in Germany, the orientation folders elaborated in the Netherlands were used. Surprisingly, the study claims that receiving occupational therapy sessions does not result in greater benefits in the functioning of the elderly compared to the benefits achieved with the consulting sessions.

Measurement of the effectiveness of interventions in this clinical trial may be compromised since comparisons are made in different countries (the Netherlands and Germany), and the cultural issue must be considered and analyzed in greater depth to define the real benefits of the sessions occupational therapy and consulting services in each population.

Another essentially important approach is done in partnership with the people who are the most knowledgeable of the patient's life: the relatives and caregivers of the elderly with AD. These people are seen as the "hidden patients" affected by Alzheimer's disease, as they need help to manage the day-to-day stress arising from the production of care and the many challenges that arise daily (GITLIN; CORCORAN, 2005). For interventions directed to the social environment, the objective of occupational therapy is to carry out actions that have a direct or indirect impact on the social relationships that are established by the elderly.

Professionals use educational and support strategies to caregivers and family so they can keep the elderly person with dementia in a successful interaction with their activities and with others (KATZ; BAUM, 2012). This approach is essential for the maintenance of quality of life, insofar as it allows the elderly to stay longer in their family environment, with autonomy (SOARES; SOARES; CAIXETA, 2012).

In their work, the occupational therapist encourages caregivers to systematically observe the behavior of the elderly and what concerns them in the functional capacity and safety (SOHLBERG; MATEER, 2010). The professional will assist in the development of an efficient and simplified care plan, considering the demands of the activity and the level of care that the elderly need (GITLIN et al., 2005). The caregiver should always be aware of the habits, values, cultural issues and styles of the elderly to seek the maximum of activities with autonomy and ensure the preservation of the patient's identity (ASSIS; ASSIS; CARDOSO, 2013).

In this research, there are six articles in which interventions are focused on education or training programs for caregivers (01, 03, 04, 06, 07 and 09). Three studies are randomized clinical trial type, that is, level 1 of scientific evidence (studies 01, 07 and 09); a qualitative research (04); a case study (06) and an article with two types of methodological design, descriptive and cross-sectional qualitative (03).

The studies of Graff et al. (2007) and Wenborn et al. (2013) (01 and 09) were targeted by informal caregivers of Dutch elderly people living in their homes and formal caregivers of different British asylum institutions respectively. The approach taken by occupational therapy in both studies was the sharing of knowledge and information so caregivers could better understand the development of the disease, learn about coping strategies in the face of behavioral problems of people with dementia and receive guidance on caring. The second study also added the individual sessions with the caregivers for practical classes, as well as an exercise book manual.

In the study by Wenborn et al. (2013), the orientation and training program, even with positive feedback from the participants, did not present evidence that the intervention had an effect on the increase of functionality for the elderly when compared to the control group. This may have been attributed to poor adherence of caregivers to the training program.

For those who performed the training, the reports of worsening of the quality of life of the elderly stand out. This perception seems to be linked to the greater awareness of caregivers about the disease and its impacts on the daily life of the elderly people. It is presumed that they become able to identify the evolution of the disease and the inadequacies in the institutions that can contribute to the worsening of the quality of life of the elderly with AD (WENBORN et al., 2013).

In the study 01, as previously reported, the intervention to the caregiver is associated with lower work overload, increased sense of competence to care, improvement of the quality of life of the dyad, besides the increase of the functionality of the elderly (GRAFF et al., 2007).

These results diverge from the study by Cooke et al. (2001), who argue that there is little evidence that education and caregiver counseling can improve the well-being and quality of life of the dyad. However, in a current systematic review with meta-analysis performed by Marim et al. (2013), the actions of education and support to the caregivers were shown to be effective in reducing overload compared with usual care.

Similar to the studies by Graff et al. (2007), Wenborn et al. (2013) and Marim et al. (2013), the systematic review by Thinnis and Padilla (2011) shows positive effects of the empowerment of caregivers on personal well-being, as well as on the lives of the elderly. In the study, supportive and educational strategies are related to protection against the onset of depression in caregivers. In this type of intervention, skills and competencies are also developed to prepare caregivers for coping with situations in which the elderly present behavioral changes. Caregivers are seen as the people who allow the elderly with AD to stay longer in their homes and community.

In the analysis of the productions of this systematic review, the scarcity of discussions about the influence of the qualification of caregivers to prolong the coexistence of the elderly in the family environment and delay institutionalization is highlighted. In the review study by Camacho et al. (2013), institutionalization is considered as the last option taken by caregivers, when no alternative is presented and there is an intense overload of the caregiver or even the presence of depressive symptoms involved in this decision making.

Even if the inherent losses in the development of the disease change the patient's perception of who he is, as well as the perception of the patient about the patient, being in the family environment contributes to the maintenance of the identity of the elderly and to the sense of belonging (DUARTE, 2004). However, long-term care institutions can provide an alternative support network for the care of elderly people with dementia, which leads us to deconstruct the idea that these places are forms of abandonment to the patient.

In this research, it was also possible to observe that the national and international literature,

in general, is more directed to the perception of care from the negative point of view, since it is a continuous, arduous and often painful activity. In a different perspective, the qualitative research of Donovan and Corcoran (2010) (04) sought to capture positive attitudes of care adopted after the training program for caregivers of elderly people with AD, in moderate to severe stages.

It is known that, at this stage of the disease, care must be offered most of the time, since the elderly are dependent in almost all daily activities. Even so, strategies, such as organization of the home environment, structuring routines, continuous communication with the family and use of humor, appeared as adopted attitudes and that support a positive relationship between caregiver and elderly with AD (DONOVAN; CORCORAN, 2010).

Other behaviors aimed at self-care (healthy eating, physical activities or religious activities) appear as motivators to continue to perform the activity of caring, as well as contribute to the better perception of their well-being.

Finally, the research of Chiu et al. (2009) (03), carried out with Chinese caregivers living in Canada, used an internet-based support program to guide and empower elderly people with AD. All interfaces were arranged in English and Mandarin to ensure the training of study participants.

In the evaluation of overload before the intervention, the caregivers presented moderate to high-stress levels and others were clinically depressive. In the intervention, younger caregivers joined the online program more than their older counterparts. On the other hand, the older ones had a better sense of competence to take care, compared to the younger ones. Caregiver overload decreased after the intervention (CHIU et al., 2009).

In addition to the discussion about the use of technologies as a therapeutic resource, the notes that are presented on the cultural context of care are also relevant. As an example, it is the tradition of Chinese families to take care of their relatives. Thus, at some stage of life, relatives are expected to provide care to the elderly (CHIU et al., 2009). Research participants realize that the view of caring for them is different from the Western view. Thus, even though the signs of overload are evident in this ongoing task, there is a positive perception of Chinese caregivers about the role they play.

The low adherence to the use of technology by an audience of older caregivers, evidenced in the study by Chiu and collaborators (2009) (n° 03) is a subject that has recently been discussed in gerontechnology.

In the study identified, the failure to remember how to use the technology or to believe that there is no need for this device to provide care were the reasons stated by caregivers for not incorporating the technology into their routines.

It is known that caregivers (composed mostly of female relatives) are also already in middle age or even in old age. Thus, it should be understood that these caregivers - born before the accentuated technological development of the 1990s - did not have, as children and young adults, access to the technologies available today. Their lifelong experiences have been shaped in technological environments that differ - and much - from today's environments (TAVARES, 2015).

In this current scenario, learning to use the wide range of digital devices competently is a significant problem for older individuals trying to adapt to the new technological society (BIANCHETTI, 2008). Thus, opting for the use of computers for the intervention, according to study n° 03 may have been a barrier to the effective training of caregivers.

Given the complexity of using technology, older people need access to technology training programs that consider the limitations of learning, respect for differences and age-related difficulties, so that there is "learning success" (LEE; CZAJA; SHARIT, 2006).

In general, the analysis of publications that use environmental interventions highlights the absence of approach to the elderly in the advanced stage of the disease. This reality is also pointed out in the study of scoping review by Struckmeyer and Pickens (2016). The authors report that, at this stage, the cost of adapting and modifying the physical environment may not be appropriate to the family's financial patterns.

Also, the fact that, at this stage, it is imperative to provide full-time care to this elderly person, due to the functional impairment already expected by the evolution of the disease. This creates a greater burden on caregivers. Thus, by the aforementioned factors, decisions for the institutionalization of the elderly begin to be discussed among family members.

4 Limitations of the Study and Recommendations

The limitations of this study occurred due to the methodological approach adopted. There is a restriction of the analysis for environmental interventions. Thus, comparisons of the effects of environmental interventions to other types of interventions, in the field of occupational therapy, could contribute

to a better understanding of the different actions and their impact on the daily life of elderly people with Alzheimer's Disease. There is also a need to expand knowledge about possible occupational therapeutic interventions, considering their effects for mechanisms of pharmacological action.

Regarding to the Brazilian scientific production of occupational therapy, studies of a higher level of scientific evidence are recommended to allow comparisons between the actions of the different countries, as well as favoring the consolidation of the field of production of national knowledge.

5 Conclusion

In the occupational therapeutic interventions directed to the physical environment, the current published experiences, in the researched databases, recommend the organization of the domestic spaces with visual cues and signs to reduce the cognitive demand and to structure the routine of the elderly with dementia. These resources promote, for a prolonged time, greater engagement of the elderly in activities that were routine.

In the interventions directed to the social environment, the educational and training programs of the caregivers of elderly people with Alzheimer's disease stand out. The training facilitates a better understanding of the evolution of the disease, helping coping strategies to deal with the cognitive and behavioral changes of the sick person, and addressing guidelines to strengthen the affective bond of the dyad. Also, these interventions are associated with a lower workload of the caregiver, a better sense of competence among caregivers and a better perception about the quality of life.

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Author's Contributions

Lilian Dias Bernardo participated in all the stages to elaborate the article (text design, organization of sources and/or analysis, writing of the text, revision). Taiuani Marquine Raymundo participated in the discussion and revision of the text. All authors approved the final version of the text.

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