

# Improving dementia care: A multi-sensory stimulation approach

J Cruz<sup>1</sup>, A Barbosa<sup>2</sup>, A Marques<sup>3</sup>, D Figueiredo<sup>4</sup> and L Sousa<sup>5</sup>

<sup>1,2,5</sup>Health Sciences Autonomous Section, University of Aveiro,  
Aveiro, PORTUGAL

<sup>3,4</sup>Higher School of Health, University of Aveiro,  
Aveiro, PORTUGAL

<sup>4,5</sup>Unidade de Investigação e Formação sobre Adultos e Idosos,  
Porto, PORTUGAL

<sup>1</sup>[joana.cruz@ua.pt](mailto:joana.cruz@ua.pt), <sup>2</sup>[anabarbosa@ua.pt](mailto:anabarbosa@ua.pt), <sup>3</sup>[amarques@ua.pt](mailto:amarques@ua.pt), <sup>4</sup>[daniela.figueiredo@ua.pt](mailto:daniela.figueiredo@ua.pt), <sup>5</sup>[lilianax@ua.pt](mailto:lilianax@ua.pt)

## RESUMO

Este estudo-piloto investigou os efeitos de um programa de Estimulação Multi-Sensorial (EMS) na interação das pessoas idosas com demência institucionalizadas. Participaram no estudo 6 idosos com demência moderada/severa. Seis cuidadores formais participaram em 8 sessões sobre a aplicação da EMS nas rotinas de cuidados. Os dados foram recolhidos através de gravação em vídeo dos cuidados matinais, antes e após o programa. Verificou-se um aumento do olhar dirigido ao cuidador, riso, comunicação verbal e envolvimento na tarefa, e redução dos olhos fechados. A introdução da EMS pode aumentar o envolvimento e comunicação dos idosos, melhorando assim o seu bem-estar.

**Palavras-chave:** demência, estimulação multi-sensorial, cuidados matinais, cuidadores formais

## ABSTRACT

This pilot-study examined the effects of a Multisensory Stimulation (MSS) programme on the interaction of residents with dementia. Six residents with moderate/severe dementia from an old people's home were recruited. Six staff members received 8 training sessions and assistance to implement MSS in dementia care. Observational data on residents' behaviour during morning care was collected pre- and post-intervention. Results suggest improvements of caregiver-direct gaze, laugh, verbal communication and task involvement, and a reduction of closed-eyes. The introduction of MMS during care routines may improve residents' involvement and facilitate communication, potentially improving their well-being.

**Key-words:** dementia, multisensory stimulation, morning care, formal caregivers

## 1. INTRODUCTION

Dementia is a complex and progressive condition common in the elderly and a major cause of disability and mortality (Berg et al., 2010; Berr et al., 2005). It is characterised by a progressive loss of cognitive functions and a gradual deterioration of people's communication and functional abilities (Kovach & Magliocco, 1998). As the disease progresses, the ability to receive and transmit information decreases, which makes it difficult for the elderly to communicate their needs and wishes (Camp et al., 2002; Hadley et al., 1999; Hancock et al., 2006), and limits their contact with the environment (Hansebo & Kihlgren, 2002; Norberg et al., 2003). Furthermore, several factors may contribute to the progressive loss of functionality such as: decreased environmental, sensory and social stimulation (Camp et al., 2002), decreased mobility and balance, as well as memory loss (Christofolletti et al., 2008).

Although some of the symptoms are an inevitable result of the condition, it has been suggested that the reduced ability to communicate and the lack of appropriate stimulation experienced by elderly with dementia, particularly in older people's homes (Bowlby, 1992; Hubbard et al., 2002; Milev et al., 2008; Namazi & Johnson, 1996), may contribute to an increase in behavioural problems (such as agitation, apathy and wandering) and a gradual loss of skills (Baker et al., 2003; Buettner et al., 1996; Kovach & Magliocco,

1998). In fact, institutional settings have been shown to be unstimulating, resulting in some degree of sensory deprivation (Baker et al., 2003; Hubbard et al., 2002). Moreover, it is suggested that the care provided to the residents in these institutions tends to foster dependency on the caregiver, regardless of resident abilities (Galik, 2010). These findings may be explained by the limited specific training of care home staff in providing care to people with complex needs, such as those with advanced dementia (Beck et al., 1999; Moniz-Cook et al., 1998; Orrell et al., 2007). It has been recognised that the quality of the relationship between care home staff and residents with dementia is strongly associated with patient functioning and behavioural symptoms (Kuske et al., 2009; van Weert et al., 2006), suggesting that staff should be aware of their important position in providing social engagement (Williams, 2006), thereby improving residents' well-being and quality of life (Logsdon et al., 2007).

Multisensory stimulation (MSS) is a psychosocial intervention which aims to reduce behavioural problems of the residents suffering from dementia, by increasing enjoyable contact with patients, reducing their isolation and providing opportunities for the residents to express themselves (Hamill & Connors, 2004). This type of intervention is believed to improve communication with people in advanced stages of dementia, as it does not involve the need for higher cognitive processes (Baillon et al., 2002; Baker et al., 2003; Bowlby, 1992; Kovach & Magliocco, 1998). Through the active stimulation of the primary senses (smell, touch, sight, hearing and taste) (Verkaik et al., 2005; Vozzella, 2007), as well as vestibular and proprioceptive stimulation (Baillon et al., 2004), MSS approach has the potential to increase individuals' engagement with, and awareness of their surroundings (Baillon et al., 2002). Previous research has suggested that MSS interventions can have a positive effect on patients with dementia (Baillon et al., 2002): decreased frequency of behavioural problems and apathy (van Weert et al., 2005a; Verkaik et al., 2005), increased levels of interaction (Hope et al., 2004; van Weert et al., 2008) and attentiveness to the environment (van Weert et al., 2006), and improved well-being of the residents (Boote et al., 2006; van Weert et al., 2005a). However, the benefits found were only short-term effects (Chung & Lai, 2002; Muñoz et al., 2009), suggesting that the application of MSS should be performed on a daily basis, integrating MSS throughout the day (van Weert et al., 2006), in order to investigate if it is possible to extend the achieved benefits for a longer period of time. As formal caregivers spend the most time with residents (Fleischer et al., 2009), they may play an important role in the implementation of MSS in daily care routines (van Weert et al., 2005a). Thus, there is a need to train staff with the necessary knowledge and skills to apply MSS strategies in the provision of daily care, facilitating effective interaction with residents and enhancing their attentiveness to the environment, and, therefore, improving residents' well-being and quality of life (van Weert et al., 2005a, b).

This study aimed to examine the effects of the implementation of a MSS programme in the provision of daily morning care routines by staff, on the interaction of residents with dementia. Morning care was chosen as recent literature indicates that this is the period where more interaction between staff and resident occurs (Sloane et al., 2007). Moreover, it is usually during morning care that problematic behaviours are more frequent (Sloane et al., 2007; van Weert et al., 2006). Morning care was defined as the period of time between 07:00am and 12am, when formal caregivers "are engaged with residents in activities relating to bathing, grooming, dressing and toileting" (van Weert et al., 2005b, p.313).

## 2. METHODS

### 2.1 Design

A single-group, pre- and post-test design was carried out. The study was performed in an old people's home, in the central region of Portugal (district of Aveiro).

### 2.2 Recruitment and Participant Eligibility

**2.2.1 Formal Caregivers.** The study was first presented to the manager of the institution whose collaboration was asked to identify potential staff participants who maintained direct contact with residents with dementia during the provision of daily care. Nine staff members were identified. However, prior to the start of the programme, 3 staff members had to abandon the study (1 due to health problems, 1 for personal reasons, and 1 because the person quitted her job). Therefore, 6 formal caregivers have participated in the study.

**2.2.2 Residents with Dementia.** Fifteen residents with dementia were identified by the physician of the institution with potential to participate in the study. The residents had to meet the following criteria: (1) present moderate to severe dementia, according to the clinical diagnosis; (2) need staff assistance during morning care; (3) absence of another psychiatric diagnosis. After informing about the study, informed consent was obtained from the relative legal guardian of each resident with dementia. Eight residents participated in the study. However, one of the residents died during the implementation of the programme,

and therefore that information was removed from the study. In addition, one of the residents was excluded as he/she refused to be video-recorded. Thus, 6 residents with moderate to severe dementia have been included.

### 2.3 Intervention

Staff participants received training regarding dementia and its effects on patients, and practical strategies to implement MSS during the daily morning routines. The training was performed in the institution by a multidisciplinary team, which included a gerontologist, a physiotherapist and a psychologist. It consisted of 8 sessions, one every two weeks, over a four-month period. In the following three days after each session, the gerontologist and the physiotherapist assisted staff during the provision of morning care to residents (i.e. bathing, dressing and toileting), in order to clarify some doubts and make suggestions which could improve the quality of the care provided. Recent literature has highlighted the importance of the combination of staff training and further assistance to facilitate changes in practice and to promote continuous improvement of acquired skills (Levy-Storms, 2008).

### 2.4 Data Collection

The effects of MSS implementation by care home staff during the provision of morning care on the interaction of the residents with dementia were studied through the observation of video-recordings, before and immediately post the programme. The video camera was fastened to the top of a tripod, placed in the bathroom and turned on before the person with dementia enter the bathroom, in order to avoid affecting residents' behaviours through the presence of strangers (the researchers) in the room. Furthermore, when verbal communication was possible, the staff member informed the resident about the camera and asked permission to start video-recording. All staff participants were instructed to remove the video-camera if they noticed any negative reaction of the residents, caused by the presence of the device. Twelve video-recordings were obtained (6 in the baseline and 6 post the programme). Several video-recordings were performed prior to data collection in order to minimise the effect of the video-camera on residents' behaviours.

### 2.5 Data Analysis

The effects of MSS on the interaction of residents with dementia were studied by analysing the frequency and duration of a list of behaviour categories (ethogram) derived from the existing literature (Caris-Verhallen et al., 1999; Sloane et al., 2007; van Weert et al., 2005b) and from preliminary observations of the video-recordings. Thus, the behaviour list contained the following categories (Table 1) Table 1 – *Categories of the* : caregiver-direct gaze, laugh, verbal communication, closed eyes, and task engagement. The first three categories have been described as a way to facilitate interaction between residents and caregivers (van Weert et al., 2008), closed eyes was associated with disengagement (Wood et al., 2009), and task engagement was considered as an important activity to maintain residents' independence (Engelman et al., 1999).

**Table 1 – Categories of the ethogram.**

<b>Categories</b>	<b>Definition</b>
<b>Caregiver-direct gaze</b>	The resident looks at the caregiver.
<b>Laugh</b>	The resident smiles and produces a sound commonly associated with the act of laughing.
<b>Verbal communication</b>	The resident articulate words or sentences with meaning, voluntarily and purposely, in order to communicate with the caregiver. Verbal aggression is excluded.
<b>Closed eyes</b>	The resident closes his/her eyes, and keep them closed for more than one second.
<b>Task engagement</b>	The resident moves the body or a body part in order to perform a task, or a part of it, which is related with the morning care activity (e.g. reach the towel, clean up his/her face, wash a body part).

Two independent observers assessed each of the 12 video-recordings of morning care and rated residents' interaction according to the categories using specialised software, NOLDUS The Observer® XT 7.0 (Noldus International Technology, Leesburg, VA, USA). The observers were previously trained on the software and were blinded to the phase of the intervention (pre and post the training period). The smallest duration of the video-recording of morning care was 3,88 minutes. Thus, the other video-recordings were cut to standardise

the observation time, so comparisons would be possible.

Analyses were conducted using the PASW® Statistics Base (version 18.0 for Windows, SPSS Inc., Chicago, Illinois). The differences from pre- to post-intervention phase were explored using the non-parametric Paired-Sample Sign test, and a p-value below 0,05 was considered statistically significant.

*2.5.1 Reliability Analysis.* To rate inter-observer reliability, measures of relative reliability, the Intraclass Correlation Coefficient (ICC), and absolute reliability, Bland and Altman (BA) plots, were performed for each behaviour category in both phases (pre- and post-intervention). These methods have been recommended as the more appropriate to assess inter-rater reliability using continuous data, and both should be used (Rankin and Stokes, 1998).

### 3. RESULTS

#### 3.1 Sample Characterisation

Six (n=6) residents with moderate to severe dementia, age range 66 to 93 years old (80,83±SD=10,87) participated in the study (2 males).

#### 3.2 Reliability of the Observations

*3.2.1 Relative Reliability.* The ICC values ranged between 1,00 and 0,49 for all behaviour categories, indicating excellent to moderate reliability (Fleiss, 1986).

*3.2.2 Absolute Reliability.* Bland and Altman plots were analysed in all categories and no systematic bias was revealed.

#### 3.3 Effects on Residents' Interaction

Table 2 provides the results of the mean frequency and mean duration of each behaviour, for both phases (pre- and post-intervention). The results suggest an improvement in frequency and duration of residents' engagement in morning care tasks. With regard to non-verbal communication, the frequency and duration of caregiver-direct gaze and laugh increased post the programme, whereas there was a reduction in the frequency and duration of closed eyes. There was also an increase in the frequency of verbal communication. Though, the differences were not statistically significant.

**Table 2 – Changes in residents' behaviours during morning care.**

Categories	Type	Pre Test mean (SD)	Post Test mean (SD)	p-value (1-tailed) <sup>a</sup>
<b>Caregiver-direct gaze</b>	Frequency (count)	0,50 (0,84)	1,92 (2,15)	0,312
	Duration (seconds)	0,67 (1,21)	5,42 (7,90)	0,312
<b>Laugh</b>	Frequency (count)	0,00 (0,00)	0,17 (0,41)	0,500
	Duration (seconds)	0,00 (0,00)	0,25 (0,61)	0,500
<b>Verbal communication</b>	Frequency (count)	5,83 (4,55)	7,58 (6,60)	0,500
	Duration (seconds)	26,75 (44,21)	20,42 (25,60)	0,500
<b>Closed eyes</b>	Frequency (count)	2,67 (6,05)	2,42 (5,68)	0,250
	Duration (seconds)	33,25 (79,01)	18,92 (44,88)	0,125
<b>Task engagement</b>	Frequency (count)	3,92 (3,63)	6,42 (6,64)	0,500
	Duration (seconds)	41,50 (51,45)	63,00 (58,73)	0,500

<sup>a</sup>Using the Paired-Sample Sign test.

### 4. DISCUSSION

The results have indicated an improvement in residents' levels of interaction during morning care routines after the MSS programme, as they exhibited an increase in caregiver-direct gaze, laugh, verbal communication and engagement in the morning care tasks, and a reduction of closed eyes, in comparison to their baseline responses. In the post intervention phase, residents with dementia appeared to be more attentive

to the surroundings, showing less inactive behaviour during morning care. These findings are in agreement with the previous research (Muñoz et al., 2009; van Weert et al., 2005b, a). Indeed, there appears to be a link between residents' communication (van Weert et al., 2008) and engagement (Harmer & Orrell, 2008), and the quality of life of the individuals, even in advanced stages of dementia. Thus, providing residents with appropriate levels of stimulation and involvement may enhance their lives, and improve their social interaction and day-to-day living (Riley et al., 2009).

Although the improvements were not statistically significant, the results of this study are promising in suggesting that a change in staff provision of personal care, by introducing MSS strategies during daily routines, may be related to positive effects on residents with advanced dementia (van Weert et al., 2006). Training staff with practical skills to integrate MSS in daily care may encourage and enable them to meet the needs of residents for social interaction (Fleischer et al., 2009), thereby improving their well-being and quality of life. Moreover, when associated with on-the-floor assistance and feedback, it is believed to increase motivation to change staff practices (Davison et al., 2007), and to sustain these behaviour changes over time (Levy-Storms, 2008). Education and assistance may also have secondary benefits for the staff members, as they become more aware of how to effectively communicate with residents suffering from dementia. The main benefits include an increase on staff job satisfaction and a reduction of stress and burnout, possibly through an increased sense of competence and self-worth (McCabe et al., 2007).

## 5. CONCLUSIONS

The findings of this study suggest that MSS programmes in old people's homes may have positive implications in the quality of care provided to the residents suffering from dementia, as well as on their well-being and quality of life. However, further research with larger samples, including several facilities and control groups, is required to develop the MSS evidence-base practice and its implementation by care home staff during daily care routines, exploring its impact on residents' and staff well-being.

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## 6. REFERENCES

- Allen-Burge, R., Burgio, L., Bourgeois, M., Sims, R., & Nunnikhoven, J. (2001). Increasing Communication Among Nursing Home Residents. *Journal of Clinical Geropsychology*, 7(3), 213-230.
- Baillon, S., Diepen, E. V., Prettyman, R., Redman, J., Rooke, N., & Campbell, R. (2004). A comparison of the effects of Snoezelen and reminiscence therapy on the agitated behaviour of patients with dementia. *International Journal of Geriatric Psychiatry*, 19(11), 1047-1052.
- Baillon, S., van Diepen, E., & Prettyman, R. (2002). Multi-sensory therapy in psychiatric care. *Adv Psychiatr Treat*, 8(6), 444-450.
- Baker, R., Holloway, J., Holtkamp, C. C. M., Larsson, A., Hartman, L. C., Pearce, R. (2003). Effects of multi-sensory stimulation for people with dementia. *Journal of Advanced Nursing*, 43(5), 465-477.
- Beck, C., Ortigara, A., Mercer, S., & Shue, V. (1999). Enabling and empowering certified nursing assistants for quality dementia care. *International Journal of Geriatric Psychiatry*, 14(3), 197-211.
- Berg, A., Sadowski, K., Beyrodt, M., Hanns, S., Zimmermann, M., Langer, G. (2010). Snoezelen, structured reminiscence therapy and 10-minutes activation in long term care residents with dementia (WISDE): study protocol of a cluster randomized controlled trial. *BMC Geriatrics*, 10(1), 1-7.
- Berr, C., Wancata, J., & Ritchie, K. (2005). Prevalence of dementia in the elderly in Europe. *European Neuropsychopharmacology*, 15(4), 463-471.
- Boote, J., Lewin, V., Beverley, C., & Bates, J. (2006). Psychosocial interventions for people with moderate to severe dementia: A systematic review. *Clinical Effectiveness in Nursing*, 9(Supplement 1), e1-e15.
- Bowlby, C. (1992). *Therapeutic Activities With Persons Disabled by Alzheimer's Disease and Related Disorders*. Shoal Creek Boulevard, Texas: Pro-Ed Inc.
- Buettner, L. L., Lundegren, H., Lago, D., Farrell, P., & Smith, R. (1996). Therapeutic recreation as an intervention for persons with dementia and agitation: An efficacy study. *American Journal of Alzheimer's Disease and Other Dementias*, 11(5), 4-12.
- Camp, C. J., Cohen-Mansfield, J., & Capezuti, E. A. (2002). Mental Health Services in Nursing Homes: Use of Nonpharmacologic Interventions Among Nursing Home Residents With Dementia. *Psychiatr Serv*, 53(11), 1397-1404.
- Caris-Verhallen, W. M. C. M., Kerkstra, A., & Bensing, J. M. (1999). Non-verbal behaviour in nurse-elderly

- patient communication. *Journal of Advanced Nursing*, 29(4), 808-818.
- Christofoletti, G., Oliani, M. M., Gobbi, S., Stella, F., Teresa, L., Gobbi, B. (2008). A controlled clinical trial on the effects of motor intervention on balance and cognition in institutionalized elderly patients with dementia. *Clinical Rehabilitation*, 22(7), 618-626.
- Chung, J. C., & Lai, C. K. (2002). Snoezelen for dementia. *Cochrane Database Syst Rev*(4), CD003152.
- Davison, T. E., McCabe, M. P., Visser, S., Hudgson, C., Buchanan, G., & George, K. (2007). Controlled trial of dementia training with a peer support group for aged care staff. *International Journal of Geriatric Psychiatry*, 22(9), 868-873.
- Engelman, K. K., Altus, D. E., & Mathews, R. M. (1999). Increasing Engagement in Daily Activities by Older Adults with Dementia. *Journal of Applied Behavior Analysis*, 32(1), 107-110.
- Fleischer, S., Berg, A., Zimmermann, M., Wüste, K., & Behrens, J. (2009). Nurse-patient interaction and communication: A systematic literature review. *Journal of Public Health*, 17(5), 339-353.
- Fleiss, J. (1986). *The design and analysis of clinical experiments*. New York: John Wiley & Sons.
- Galik, E. (2010). Function-Focused Care for LTC Residents with Moderate-to-Severe Dementia: A Social Ecological Approach. *Annals of Long-Term Care: Clinical Care and Aging*, 18(6), 27-32.
- Hadley, C., Brown, S., & Smith, A. (1999). Evaluating interventions for people with severe dementia: using the Positive Response Schedule. *Aging and Mental Health*, 3, 234-240.
- Hamill, R., & Connors, T. (2004). *Care-Giving in Dementia – Research and Applications: Vol.3. Sonas aPc: Activating the Potential for Communication Through Multi-sensory Stimulation*. New York, United States of America: Brunner-Routledge.
- Hancock, G. A., Woods, B., Challis, D., & Orrell, M. (2006). The needs of older people with dementia in residential care. *International Journal of Geriatric Psychiatry*, 21(1), 43-49.
- Hansebo, G., & Kihlgren, M. (2002). Carers' interactions with patients suffering from severe dementia: a difficult balance to facilitate mutual togetherness. *Journal of Clinical Nursing*, 11(2), 225-236.
- Harmer, B. J., & Orrell, M. (2008). What is meaningful activity for people with dementia living in care homes? A comparison of the views of older people with dementia, staff and family carers. *Aging & Mental Health*, 12(5), 548 - 558.
- Hope, K. W., Easby, R., & Waterman, H. (2004). 'Finding the person the disease has' - The case for multisensory environments. *Journal of Psychiatric & Mental Health Nursing*, 11(5), 554-561.
- Hubbard, G., Cook, A., Tester, S., & Downs, M. (2002). Beyond words: Older people with dementia using and interpreting nonverbal behaviour. *Journal of Aging Studies*, 16(2), 155-167.
- Kovach, C. R., & Magliocco, J. S. (1998). Late-stage dementia and participation in therapeutic activities. *Applied Nursing Research*, 11(4), 167-173.
- Kuske, B., Luck, T., Hanns, S., Matschinger, H., Angermeyer, M., Behrens, J. (2009). Training in dementia care: a cluster randomized controlled trial of a training program for nursing home staff in Germany. *International Psychogeriatrics*, 21(2), 295-308.
- Levy-Storms, L. (2008). Therapeutic communication training in long-term care institutions: Recommendations for future research. *Patient Education and Counseling*, 73(1), 8-21.
- Logsdon, R., McCurry, S., & Teri, L. (2007). Evidence-based interventions to improve quality of life for individuals with dementia. *Alzheimer's Care Today*, 8(4), 309-318.
- McCabe, M. P., Davison, T. E., & George, K. (2007). Effectiveness of staff training programs for behavioral problems among older people with dementia. *Aging & Mental Health*, 11(5), 505-519.
- Milev, R. V., Kellar, T., McLean, M., Mileva, V., Luthra, V., Thompson, S. (2008). Multisensory Stimulation for Elderly With Dementia: A 24-Week Single-Blind Randomized Controlled Pilot Study. *American Journal of Alzheimer's Disease and Other Dementias*, 23(4), 372-376.
- Moniz-Cook, E., Agar, S., Silver, M., Woods, R., Wang, M., Elston, C. (1998). Can staff training reduce behavioural problems in residential care for the elderly mentally ill? *International Journal of Geriatric Psychiatry*, 13(3), 149-158.
- Muñoz, I. C., Martínez, M. G., Ruiz, C. S., & Ríos, J. P. M. (2009). Tratamiento de Snoezelen para la demencia. *Fisioterapia y Calidad de Vida*, 12(3), 33-46.
- Namazi, K. H., & Johnson, B. D. (1996). Issues related to behavior and the physical environment: Bathing cognitively impaired patients: Little attention has been directed to understanding the source of the stress or developing strategies that might mitigate problem bathing behaviors among patients with dementia. *Geriatric Nursing*, 17(5), 234-238.
- Norberg, A., Melin, E., & Asplund, K. (2003). Reactions to music, touch and object presentation in the final stage of dementia: an exploratory study. *International journal of nursing studies*, 40(5), 473-479.
- Orrell, M., Hancock, G., Hoe, J., Woods, B., Livingston, G., & Challis, D. (2007). A cluster randomised controlled trial to reduce the unmet needs of people with dementia living in residential care. *International Journal of Geriatric Psychiatry*, 22(11), 1127-1134.
- Rankin, G. & Stokes, M. (1998) Reliability of assessment tools in rehabilitation: an illustration of appropriate

- statistical analyses. *Clinical Rehabilitation*, 12, 187-199.
- Riley, P., Alm, N., & Newell, A. (2009). An interactive tool to promote musical creativity in people with dementia. *Computers in Human Behavior*, 25(3), 599-608.
- Sloane, P. D., Miller, L. L., Mitchell, C. M., Rader, J., Swafford, K., & Hiatt, S. O. (2007). Provision of Morning Care to Nursing Home Residents With Dementia: Opportunity for Improvement? *American Journal of Alzheimer's Disease and Other Dementias*, 22(5), 369-377.
- van Weert, J. C. M., van Dulmen, A. M., Spreeuwenberg, P. M. M., Ribbe, M. W., & Bensing, J. M. (2005a). Behavioral and Mood Effects of *Snoezelen* Integrated into 24-Hour Dementia Care. *Journal of the American Geriatrics Society*, 53(1), 24-33.
- van Weert, J. C. M., van Dulmen, A. M., Spreeuwenberg, P. M. M., Ribbe, M. W., & Bensing, J. M. (2005b). Effects of *snoezelen*, integrated in 24 h dementia care, on nurse-patient communication during morning care. *Patient Education and Counseling*, 58(3), 312-326.
- van Weert, J. C. M., Janssen, B. M., van Dulmen, A. M., Spreeuwenberg, P. M. M., Bensing, J. M., & Ribbe, M. W. (2006). Nursing assistants' behaviour during morning care: effects of the implementation of *snoezelen*, integrated in 24-hour dementia care. *Journal of Advanced Nursing*, 53(6), 656-668.
- van Weert, J. C. M., van Dulmen, A. M., & Bensing, J. M. (2008). *Alzheimer's Disease: New Research. What factors affect caregiver communication in psychogeriatric care?*. New York, United States of America: Nova Science Publishers.
- Verkaik, R., Weert, J. C. M. v., & Francke, A. L. (2005). The effects of psychosocial methods on depressed, aggressive and apathetic behaviors of people with dementia: a systematic review. *International Journal of Geriatric Psychiatry*, 20(4), 301-314.
- Vozzella, S. (2007). Sensory Stimulation in Dementia Care: Why It Is Important and How to Implement It. *Topics in Geriatric Rehabilitation*, 23(2), 102-113.
- Williams, K. N. (2006). Improving outcomes of nursing home interactions. *Research in Nursing & Health*, 29(2), 121-133.
- Wood, W., Womack, J., & Hooper, B. (2009). Dying of Boredom: An Exploratory Case Study of Time Use, Apparent Affect, and Routine Activity Situations on Two Alzheimer's Special Care Units. *The American Journal of Occupational Therapy*, 63(3), 337-350.