

Critical Review:

The efficacy of interventions designed to maintain or improve self-feeding ability in elderly individuals with dementia.

Jaime D'Arcey

M.Cl.Sc SLP Candidate

University of Western Ontario: School of Communication Sciences and Disorders

Declines in self-feeding ability are commonly seen in elderly patients with dementia, however, feeding dependence has been shown to be a significant risk factor for aspiration pneumonia (Langmore et al., 1998). The published literature investigating interventions aimed at maintaining or improving self-feeding ability in individuals with dementia were collected and critically evaluated. This critical review included three randomized clinical trials, two repeated measures studies, one case control study, and one action research study. Montessori-based intervention currently has the strongest evidence for its efficacy in this population. The behavioural and environmental interventions show promising evidence for their efficacy, however, the person-centered approach provided equivocal evidence. However, future research on self-feeding in dementia is needed before a strong conclusion can be drawn.

Introduction

As the baby boomer population ages, the number of individuals suffering from dementia is increasing. With disease progression, feeding and swallowing impairments typically develop, cooccurring with the normal aging related decline in the function of the swallowing mechanism. Impaired self-feeding can lead to an increased risk of aspiration, poor nutritional status and dehydration (Langmore, et al., 1998). In addition to the physical effects, it can lead to dependence upon caregivers during meal times.

In hospital, long-term care, and home care settings full assistance during meals may be provided as this may be viewed as more efficient. Fully assisted feeding, however, often leads to “learned helplessness” in which individuals lose the skills and/or motivation to feed themselves (Coyne and Hoskins, 1997). Langmore et al. (1998) found dependence during meal times to be a significant risk factor for the development of aspiration pneumonia. Furthermore, a meta-analysis examining the relationship between aspiration pneumonia in dementia and mortality, concluded that dementia patients are approximately twice as likely to die from aspiration pneumonia compared to individuals without dementia (Foley, Affoo, & Martin, 2014). This information highlights the importance of maintaining self-feeding.

Objectives

The objective of this paper is to critically review studies evaluating the efficacy of intervention strategies targeting independence in self-feeding in elderly individuals with dementia.

Methods

Search Strategy

The computerized database *Pubmed* was used to search for articles. Key words used in the search included: ‘self-feeding’, ‘eating dependency’, ‘independence at meal times’, ‘eating ability’, AND ‘dementia’. Reference lists of articles were also searched for other relevant studies.

Selection Criteria

Articles included in this critical review were chosen if they satisfied the following criteria: evaluated an intervention targeting self-feeding, examined patients with dementia, and were peer reviewed.

Data Collection

This literature search yielded seven journal articles that satisfy the selection criteria. Studies included three randomized clinical trials, two repeated measures studies, one case control study, and 1 action research study.

Results

Randomized Clinical Trials

The advantages of this design include: randomized placement of subjects removes external bias (improving external validity), no risk of carry over effects, and confounding factors can be cancelled out with a large enough sample group. The disadvantages include: this process is extremely resource heavy and large sample sizes are recommended (Shuttleworth, 2009b).

Coyne and Hoskins (1997) conducted a pilot study utilizing a randomized clinical trial with a pretest-

posttest design to evaluate the long- and short-term effect of verbal prompting and positive reinforcement on level of independence and frequency of eating in nursing home patients with dementia. The 24 nursing home residents with dementia were randomly assigned to either a treatment or control group. The intervention involved providing verbal prompts and praise related to the tasks of eating and drinking during meal times. The researchers developed the Level of Independent Eating scale that measures performance of across 9 eating and drinking tasks. Coyne and Hoskins concluded that verbal prompts and positive reinforcement can have positive short-term effects on self-feeding ability but not frequency of eating in individuals with dementia.

Strengths of this study included specific inclusion and exclusion criteria, high reported inter-rater reliability (0.96), and the use of the a self-developed, but appropriate measurement tool, and, appropriate statistical analysis was performed to evaluate the effects of the intervention. The limitation of this study is the use of a small sample size.

Overall this study provides highly suggestive evidence that short-term improvements in level of eating independence in elderly nursing home residents with dementia may occur when given verbal prompts and verbal praise during meal times.

Wu and colleagues (2014) investigated the effectiveness of combining spaced retrieval with Montessori-based activities on the eating ability, nutritional intake, and body weight of individuals with dementia. Standardized and individualized session protocols were also compared. Spaced retrieval is a cognitive technique that involves asking individuals to recall information at increasing time intervals (Vance & Farr, 2007). Montessori-based activities focus on enhancing procedural memory through breaking down daily activities into sequential tasks, and repeatedly practicing these tasks to improve performance of the daily activity (Wu et al., 2014).

There were 90 individuals with dementia recruited from veterans' homes. Twenty-four received standardized intervention, 38 received individualized intervention, and 27 individuals were in the control group. The researchers found that combining spaced retrieval with a Montessori-based intervention lead to significantly decreased eating difficulties, increased nutritional intake, and improved body weight. The standardized intervention was found to lead to greater improvements than the individualized sessions.

The strengths of this study include relatively large sample size, use of appropriate measures, appropriate

choice of statistical analyses, and a detailed description of validity and reliability of measures used. The limitations of this study include nonrandomized assignment to groups and weighing food before and after a meal to track food consumption was not completed as planned. The standardized group showed high levels of eating difficulty pre-test, which may have skewed the results.

Despite the limitations, the study provides highly suggestive evidence that the implementation of intervention protocols involving a combination of Spaced Recall and Montessori-based activities may lead to decreased eating difficulty as well as increased nutritional intake in elderly patients with dementia. Use of standardized protocol may lead to greater improvements in self-feeding ability.

Lin and colleagues (2010) constructed a protocol for and evaluated the effectiveness of Montessori-based intervention and spaced retrieval on eating difficulty in individuals with dementia. Eighty-five participants were divided into three groups: spaced retrieval, Montessori-based activities, and a control group. Pre- and post-treatment data, including eating difficulty, nutritional status, and amount consumed, were collected and analyzed. Lin and colleagues concluded that both Montessori-based intervention and spaced retrieval can lead to decreased eating difficulty in individuals with dementia and suggest that early intervention could increase the likelihood of maintaining independence. The authors recommended a crossover design for future research to control for this, which they completed in the following study.

This study has the following strengths: (1) the intervention groups received treatment from the same researchers, controlling for internal validity, (2) the intervention protocols were developed with input from a multidisciplinary team and executed in a standardized manner, (3) the study used appropriate measures, and (4) appropriate statistical analyses were used. The limitations poor tracking of food consumption, and the use of a single blind design, as participants may have been aware of the intervention received.

This study provides highly suggestive evidence that intervention following Montessori and/or spaced retrieval protocols may be implemented in clinical settings to improve eating difficulty and feeding dependence in elderly adults with dementia.

Repeated Measures Design

The advantages of this type of design include the small number of participants required and the control for natural individual variance. The disadvantage of this

design is the risk of carry over effects, however, this can be controlled for through counterbalancing the order of treatment periods (Shuttleworth, 2009a).

Lin and colleagues (2011) evaluated the effectiveness of Montessori intervention methods on improving independent feeding and nutritional status of residents with dementia living in long-term care facilities. Twenty-nine individuals with dementia living in two special care units participated. A cross-over design was used, with the units randomly assigned into two sequence groups, receiving opposite order of treatment periods. The results of this study showed significant increases in both self-feeding frequency and time spent engaged in self-feeding, as well as a decreased need for nursing intervention. The study concluded that Montessori intervention protocols are effective in improving independent feeding.

The strengths of this study include implementation of a standardized treatment protocol, use of appropriate outcome measures, use of appropriate statistical analyses, and looked at multiple variables to determine the outcome of the study, including the independence, self-feeding frequency, meal durations. While the protocol was standardized, the activities were adapted to be easier or more difficult based on individual ability. The limitations of this study include the small sample size, the length of the study, and the lack of investigation into long-term effects. Although there was evidence of carry over, this study did not directly evaluate the long-term effects of the intervention.

This study provides highly suggestive evidence that Montessori-based activities may present an evidenced-based procedure that could be implemented clinically to increase independence at meal times.

Van Ort and Phillips (1995) investigated the effects of contextual intervention and behavioural intervention on mealtime independence for individuals with dementia. The contextual intervention involved environmental changes and mealtime rules, including reducing noise and distractions, and the individualized behavioural intervention involved use of behavioural methods, such as prompting and reinforcement. This study concluded that implementing contextual and behavioural interventions are both beneficial to mealtime independence in individuals with dementia and indicated that a combination of both may be highly beneficial in nursing care environments.

The strengths include well defined measures and definitions, high inter-rater reliability, and appropriate choice of outcome measures and statistical analyses. The limitations include a small sample size of 7

participants, mealtimes were videotaped for observation, potentially influencing behaviours and only one video per subject per time period was examined due to the labor-intensive nature of transcription and coding.

Despite the limitations, this study provides suggestive evidence that improved independence at mealtimes and increased nutritional intake for individuals with dementia was found following implementation of both contextual and behavioural interventions. A combination of the approaches described may be used to promote self-feeding and benefit staff of long-term care facilities.

Case Control Study

Case control studies are often used to compare treatments. The advantages of this design include the requirement for a small sample size, can be executed quickly, inexpensive, utilizes treatment and control groups. The disadvantages are that data is not generalizable, the results are subject to bias, and selection of controls can be difficult. (Lewallen & Courtright, 1998).

Yamanda and Yamanda (2004) investigated effects of changes to the arrangement of the environment on self-feeding in individuals with dementia. The environmental arrangement intervention was administered 6 days a week over the course of 6 months to 8 out of 16 participants who were evaluated for feeding behaviours, activities of daily living, and nutritional status after the first 16 days, two months and four months of intervention. Yamanda and Yamanda concluded that arranging the environment may enhance self-feeding, but there is no evidence of its effect on nutritional intake.

The strengths of this study include the use of the same individual providing intervention each day and description of measures were provided. The limitations of this study include the small sample size, the lack of description of the environmental arrangements used in the intervention, inclusion/exclusion criteria was not provided, data was not provided, and statistical analyses were not described.

This study provides equivocal evidence given the many limitations and few strengths provided in this study. Further study is required to investigate the efficacy of environmental arrangement to improve self-feeding in this population.

Action Research Study

Action research involves the participants examining their own practice using research techniques (Ferrance, 2000). Action research is designed with the intent that

professionals use the research to improve their own practice, however, the findings are typically only applicable to a specific setting and the results are not generalizable (Thorson & Beliveau, 2012).

Jensen and colleagues (2016) investigated strategies used by nurses to promote independence at meal times for individuals with severe dementia using a person-centered approach. This was an action research study in which the members administering the intervention studied and modified their action to improve the person-centered intervention provided. Jensen and colleagues concluded that person-centered approaches focusing on individualized intervention aimed at supporting the patient's resources can be used to promote independence at mealtimes.

The study's strengths include a detailed description of factors involved in personalizing care around self feeding. The limitations of this study include the following (1) the qualitative measures used were not described, (2) it was unclear if the proposed intervention involved the reflective meetings, and (3) the conclusion that this intervention method was key for independent feeding without directly examining patient outcomes.

This study provides equivocal evidence given the many limitations and few strengths provided in this study. Further study is required to investigate the patient outcomes related to the proposed intervention method.

Discussion

The intervention methods described above employed can be grouped in to the following categories: Montessori-based training (with or without spaced retrieval), behavioural and/or environmental arrangement, and person-centered approaches.

Montessori-Based Interventions

Montessori-based intervention, with or without spaced-retrieval, has the strongest evidence for its efficacy in this population for improving/maintaining self-feeding. Three studies addressed Montessori-based intervention (Lin et al., 2010; Lin et al., 2011; Wu et al., 2014) and included use of strong study designs, large sample sizes relative to other studies reviewed, and detailed descriptions of both the methods and the results. This intervention has been found to improve self-feeding ability and decrease need for feeding assistance in individuals with dementia. However, these studies have not shown improved nutritional status, possibly due to short study durations. Another limitation of this intervention protocol may be the cost and ease of implementation within hospital, long term care and home care settings. Lin and colleagues (2010; 2011)

recommended future longitudinal study to evaluate long-term effects of these intervention protocols and BMI change following intervention.

Behavioural and Environmental Interventions

Behavioural and environmental approaches show promising results in the current literature. Coyne and Hoskins (1997) provided highly suggestive evidence that verbal prompting and praise during meal times had positive short-term effects on level of independence in individuals with dementia. However, the study concluded that there were no long-term effects of this intervention. Yamanda and Yamanda (2004) provided equivocal evidence that arranging the environment may enhance self-feeding in this population. Van Ort and colleagues (1995) provided suggestive evidence for the positive effects of both behavioural and environmental interventions on feeding dependency, indicating that a combination of both may be highly beneficial. Behavioural and environmental interventions also provide face validity and may be more easily implemented in hospital, long term care, and home care settings compared to Montessori-based intervention protocols. Future study on this topic provide stronger evidence with the use of stronger study designs and larger sample sizes to further inform the long and short-term effects of the intervention on feeding dependency.

Person-Centered Approaches

The person-centered approach presented by Jensen and colleagues (2016) provided equivocal evidence for the efficacy of person-centered care implementation by nurses to promote independence at meal times for individuals with severe dementia. Future research investigating the outcomes of the patients would strengthen the evidence for use of this approach in this population.

Conclusion

The current literature provides multiple methods to target maintained or improved self-feeding ability in elderly individuals with dementia. The Montessori-based intervention, with or without spaced-retrieval, has the strongest evidence for its efficacy in this population on self-feeding ability. However, behavioural and environmental approaches show promising results as well. The bottom line is that more research on self-feeding in dementia is needed before a strong conclusion can be drawn.

Clinical Implications

Intervention may lead to maintained or improved self-feeding ability in individuals with dementia, however, at this time there is not strong enough evidence to

implement the above-mentioned intervention methods. However, given the evidence for the short-term effects of behavioural and environmental intervention along with the potential ease and practicality of its implementation, encourage use of this combination.

Future Research

Further study of interventions targeting self-feeding in dementia are necessary to address this issue. Larger sample sizes along with studies investigating the long-term effects of the intervention, as well as the impact of intervention on disease progression, incidence of aspiration pneumonia, and mortality secondary to development of aspiration pneumonia would be beneficial to understand the impact of these interventions.

References

- Coyne, M. L., & Hoskins, L. (1997). Improving eating behaviors in dementia using behavioral strategies. *Clinical Nursing Research*, 6(3), 275-290. doi:10.1177/105477389700600307
- Ferrance, E. 2000. Action Research. Retrieved from https://www.brown.edu/academics/education-alliance/sites/brown.edu/academics/education-alliance/files/publications/act_research.pdf
- Foley, N. C., Affoo, R. H., & Martin, R. E. (2015). A systematic review and meta-analysis examining pneumonia-associated mortality in dementia. *Dementia and Geriatric Cognitive Disorders*, 39(1-2), 52-67. doi:10.1159/000367783
- Jensen, L. H., Rekve, K.H., Ulstein, I.D., & Stovdahl, K. (2016). Promoting independence at mealtimes for older persons with severe dementia. *International Practice Development Journal*, 6(2). doi: 10.19043/ipdj.62.007
- Langmore, S.E., Terpenning, M.S., Schork, A., Chen, Y., Murray, J.T., Lopatin, D., & Loesche, W.J. (1998). Predictors of Aspiration Pneumonia: How important is dysphagia? *Dysphagia*, 13(2), 69-81. doi: 10.1007/PL00009559
- Lin, L., Huang, Y., Su, S., Watson, R., Tsai, B. W., & Wu, S. (2010). Using spaced retrieval and montessori-based activities in improving eating ability for residents with dementia. *International Journal of Geriatric Psychiatry*, 25(10), 953-959. doi:10.1002/gps.2433
- Lin, L. C., Huang, Y. J., Watson, R., Wu, S. C., & Lee, Y. C. (2011). Using a Montessori method to increase eating ability for institutionalised residents with dementia: A crossover design. *Journal of Clinical Nursing*, 20(21-22), 3092–3101.
- Lewallen, S., & Courtright, P. (1998). Epidemiology in practice: Case-control studies. *Community Eye Health / International Centre for Eye Health*, 11(28), 57.
- Shuttleworth, M. (2009a, May 16). Within Subject Design. Retrieved Feb 20, 2018 from Explorable.com: <https://explorable.com/within-subject-design>
- Shuttleworth, M. (2009b, Mar 12). Randomized Controlled Trials. Retrieved Feb 22, 2018 from Explorable.com: <https://explorable.com/randomized-controlled-trials>
- Thorson, T., & Beliveau, K. 2012. Action Research [PowerPoint Slides]. Retrieved from: <https://www.slideshare.net/trudythorson/action-research-15184448>
- Van Ort, S. & Phillips, L. R. (1995). nursing interventions to promote functional feeding. *Journal of Gerontological Nursing*, 21(10), 6 - 14.
- Vance, D. E., & Farr, K. F. (2007). Spaced retrieval for ENHANCING MEMORY: Implications for nursing practice and research. *Journal of gerontological nursing* 33, (9) (09): 46-52
- Wu, H. S., Lin, L. C., Wu, S. C., Lin, K. N., & Liu, H. C. (2014). The effectiveness of spaced retrieval combined with Montessori-based activities in improving the eating ability of residents with dementia. *Journal of Advanced Nursing*, 70(8), 1891-1901. doi:10.1111/jan.12352
- Yamanda, R., & Yamanda, K. (2004). Environmental Arrangement for Enhancing Self Feeding in Elderly with Dementia. *Geriatric Nursing*, 25(1), 52-53. doi:10.1016/j.gerinurse.2003.120