

# Improving the Quality of Life in Persons with Dementia through a Pilot Study of a Creative Dance Movement Programme in an Asian Setting

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## Abstract

**Background and Objectives:** To study the effect of a creative dance movement programme on physical, social, psychological and overall well-being of dementia patients.

**Methods:** A prospective, cohort study was performed outpatient, on ten community-dwelling patients with mild-moderate dementia, with their care-givers. All the study participants underwent a creative dance movement programme (Everyday Waltzes) by two dance therapists, weekly for six weeks. The Alzheimer's disease Quality of Life Inventory (ADQoL) scores of both patients and their caregivers' impression of the patient's quality of life in each of the 13 items, and combinations of items to obtain physical, social and psychological domains, pre and post intervention were recorded in a numerical scale. Wilcoxon's signed rank test was used to determine the statistical significance of any change in summated score of each of the domains and overall score, post intervention in both patients and caregivers.

**Results:** Except for one of the items, all the items had improvements pre to post intervention ranging from 0 to 0.8 in patients and caregivers. For patients, the overall summated score was statistically significant for improvement post intervention with a p value of between 0.02 to 0.05. The improvements in the physical, psychological and social domains were not statistically significant. For caregivers, the improvement in post intervention was not statistically significant in neither the domains nor the overall score.

**Conclusion:** A creative dance movement programme had a positive effect on overall well-being in patients with mild-moderate dementia in an Asian setting.

**Keywords:** Dance-therapy; Everyday Waltzes; Creative-therapy; ADQoL; Dementia; Behavioural and Psychological Symptoms of Dementia (BPSD); Day programs; Group therapy

## Introduction

Dementia currently affects 10% of the elderly in Singapore (aged 60 and above), and the prevalence of dementia in Singapore is expected to increase by about five times by 2050, posing a significant health burden for both patients and caregivers [1,2]. It negatively impacts cognition, psychological state, behaviour and physical health, and thus overall functional state, consequently affecting quality of life for both patients and caregivers. Sørensen et al. reported that compared to non-caregivers, dementia caregivers report higher levels of mood/behavioural issues (more stress, depression and anxiety symptoms) with lower levels of subjective well-being as well as worse physical health outcomes and greater cognitive decline [3]. Medication for the treatment of dementia no doubt plays an important role, but options and benefits are limited, with bothersome side-effects [4]. As dementia unfortunately negatively impacts many domains of a patient's function, it is important that management of a patient goes beyond pharmacological intervention, and is holistic, addressing the various physical, social, psychological and functional effects on patients and consequently caregivers [5].

On such holistic therapy is dance therapy, involving physical activity performed creatively with music and dance steps, often involving social interaction. With regards to the benefits of the physical aspect of dance, various studies have showed that physical activity is associated with a decreased risk of cognitive impairment and/or improved cognitive function in older adults, as well as positive cognitive benefits in those already with dementia [6,7]. Studies have suggested that creativity helps to reinforce important neuronal connections and reduces depression [8]. Dance therapy, which combines the benefits of creativity as well as physical movements, holds promising potential to be of benefit to the well-being of individuals with dementia.

Previous studies on dance therapy in elderly adults with varying degrees of cognitive impairment have some shown improvements in single to multiple domains, eg. cognitive, physical, emotional and social [4, 9-12]. However, they were criticized for their poor methodology, leading to a dearth of good quality studies on the effect on dance in dementia [4,13]. Karkou et al. conducted a literature review to evaluate the effect of dance movement therapy on dementia but did not find a single study that passed their inclusion criteria [14].

Furthermore, there was significant heterogeneity in the type of dance approach used, with differing benefits. Dance can take many forms, with varying levels of physical exertion, complexity of movements and social interaction. It would be useful to know if possible benefits derived from dance remained intact if the degree of physical exertion and social interaction were minimised, and there was a focus on movements. This would be especially useful in patients with physical limitations. This led us to study creative dance movement forms, specifically Everyday Waltzes, where participants could engage in the dance without foot-work or requiring inter-personal interaction. Everyday Waltzes, developed by the Arts Fission Company, Singapore, for local individuals with

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dementia, involved patients performing familiar daily actions/gestures adapted to dance actions to music, conducted by dance therapists.

Hence we decided to conduct a study to evaluate if a creative dance movement programme would be beneficial to the physical, social, psychological and overall well-being of our local individuals with dementia.

## Methods

A total of 10 patients with mild-moderate dementia on outpatient neurology follow up were recruited into the study. Dementia was defined as per the DSM-IV criteria, the latest definition during the study, which required objective memory impairment and one (or more) cognitive disturbances of aphasia, apraxia, agnosia and executive function, as well as impairment in functional skills, in the absence of delirium [15]. These patients had mild to moderate dementia, with mild dementia defined as Mini Mental State Examination (MMSE) scores of at least 19-23, and moderate dementia having scores of between 10-18. All recruited patients were mobile individuals, with no diagnosed psychiatric disorders, and had the accompaniment of a caregiver.

Following explanations of the study, consent was taken from both participants and their caregivers. Both were then administered the Alzheimer's disease Quality of Life Inventory (ADQoL). The ADQoL assesses the participant's quality of life by means of a 13-item questionnaire that measures aspects of quality of life including physical health, energy, mood, living situation, memory, family, marriage, friends, self, ability to do chores around the house, ability to do things for fun, money and life as a whole. Each item could be rated poor, fair, good or excellent; with scores ranging from 1 to 4 respectively (blank answer was 0). Revell et al. previously studied the factor structure of the scale and found that other than as the overall measure of quality of life (based on the total score of the 13-item), items could be combined to provide information for 3 domains, namely, physical, psychological and social well-being [16], which we incorporated as well. The physical domain health consisted of physical health, energy, ability to do chores and things for fun. The psychological domain consisted of mood, memory, self as a whole and life as a whole. The social domain consisted of living situation, money, family, marriage and friends. Caregivers were also administered the same questionnaire to assess their perception of a patient's score in each of the items, e.g. mood.

The AD-QoL was used as many of the patients had mild dementia, and were suspected of having Alzheimer's, although it was too early in the clinical course for diagnosis to be definitive. As much, most did not have a definitive etiology for their cognitive impairment/dementia at the start of the study. The AD-QoL has also been demonstrated to be validated for use in mild and moderate cognitive impairment [17,18]. Other strengths of the ADQoL include that it can be administered quickly and can be used on both patients and caregivers.

All recruited patients together with their respective caregivers subsequently underwent an Everyday Waltzes creative dance movement programme conducted by two dance therapists, both of whom engaged with all the patients. The programme was conducted once a week, with each session lasting two hours, for a total of six weeks, so as to optimise attendance rates and maximise homogeneity of intervention exposure. We were concerned that more frequent sessions, over an extended period of time may lead to suboptimal attendance rates. Following the completion of the 6-week programme, both patients and their caregivers were re-administered the ADQoL.

After determining the individual pre and post-participation scores

for each of the items on the AD-QoL, these were aggregated into domain scores for physical, social and psychological well-being as well as overall scores. Thereafter, we calculated the mean and the standard deviation for all the patients for each of the items, as well as for the 3 domains and overall score. This was repeated for the caregivers. We decided to use Wilcoxon's signed rank test, as it compared two measurements of the same dependent variable (e.g. summated score of a single patient for physical domain) at different time points (i.e. pre-post intervention), repeated for all the patients. Our data did not follow a normal distribution, and therefore the paired t-test was not used. The p value was defined as <0.05. We subsequently evaluated pre and post summated scores for the study population for the each of the three domains as well as overall scores, and subsequently repeated this for the caregivers' scores.

## Result

All ten participants and their caregivers completed the pre and post ADQoL. The mean age was 69.0 years, with a standard deviation of 9.6 years. 50% of the study participants were male. Five of the participants were of Chinese ethnicity, two were Eurasian and one was of Indian, Malay and Singhalese ethnicity each.

In Table 1, we showed the mean and standard deviations per item, pre and post intervention, for patients, as well as for caregivers.

Items		Patient			Caregiver		
		Mean	SD	Difference of mean (post-pre)	Mean	SD	Difference of mean (post-pre)
Physical health	pre	2.5	0.5	0.4	2.3	0.7	0.2
	post	2.9	0.7		2.5	0.8	
Energy	pre	2.5	0.5	0.3	2.2	0.6	0.3
	post	2.8	0.6		2.5	0.8	
Mood	pre	1.9	0.6	0.8	2.1	0.6	0.3
	post	2.7	0.9		2.4	0.5	
Living situation	pre	2.6	0.5	0.3	2.8	0.6	-0.1
	post	2.9	1.2		2.7	0.8	
Memory	pre	1.5	0.7	0.3	1.4	0.5	0.0
	post	1.8	0.8		1.4	0.5	
Family	pre	2.5	0.5	0.2	2.5	0.5	0.3
	post	2.7	0.7		2.8	0.4	
Marriage	pre	2.3	0.9	0.5	2.4	1.0	0.3
	post	2.8	0.8		2.7	1.2	
Friends	pre	2.0	0.7	0.5	2.1	0.9	0.4
	post	2.5	0.5		2.5	1.0	
Self as a whole	pre	2.2	0.4	0.4	2.1	0.3	0.3
	post	2.6	0.7		2.4	0.5	
Ability to do chores around the house	pre	2.6	0.7	0.0	2.1	0.7	0.0
	post	2.6	0.7		2.1	0.9	
Ability to do things for fun	pre	2.0	0.7	0.5	2.1	1.0	0.3
	post	2.5	0.8		2.4	0.7	
Money	pre	2.0	0.7	0.1	2.0	0.8	0.4
	post	2.1	0.9		2.4	0.7	
Life as a whole	pre	2.2	0.4	0.1	2.3	0.7	0.4
	post	2.3	0.7		2.7	0.8	

SD: Standard Deviation

Caregiver's score refer to their perception of a patients score in each of the items.

**Table 1:** Mean and standard deviation per item, pre and post intervention, for patients and caregiver's perception of patient score in each item.

Caregivers' scores referred to their perception of the patient's score in each item. We also calculated the difference in the mean scores pre and post intervention. We found that post intervention improvement ranged from 0.0 to 0.8 for patients, and -0.1 to 0.4 for caregivers. The study was not powered to calculate if the differences in mean for individual items were significant.

In Table 2, we showed the comparison of the summated domain and overall scores per patient, together with the total mean, standard deviation and p-value for patients. Both physical and psychological had p value between 0.1 and 0.2, whilst the p value for the social domain was between 0.05 to 0.10. The overall score was statistically significant for improvement pre and post intervention, with a p-value of between 0.02 and 0.05.

In Table 3, we again showed the comparison of the summated domain and overall scores per patient, together with the total mean, standard deviation and p-value, but now for caregivers (perception of patient's scores). P values were all > 0.2 for all three domains, whilst it was between 0.1 and 0.2 for the overall score.

## Discussion

Our demographic data demonstrated that our study population was similar to the local population in terms of ethnicity and gender ratios, increasing its applicability to the local population.

On examination of Table 1, improvements in patients' mean scores for each of the items range from 0 to +0.8. For the caregivers' scores, except for living situation where post-intervention score is minimally worse (-0.1), improvements also range from 0 but with a lower maximum of +0.4. This suggests that the intervention leads to an improvement in most of the items, for both patients and caregivers, but more for the former. The study unfortunately, is not powered to confirm this statistically. It also suggests that the intervention programme has little risk of harm to patient's quality of life, decreasing its barrier for trial in larger studies or in practice.

Table 2 demonstrates that the overall post-intervention score is statistically significant for patients with a p-value of between 0.02 to 0.05, whilst scores of the individual domains are not statistically

	Summated score by patients										MEAN	SD	Wilcoxon's W	n	p-value
	1	2	3	4	5	6	7	8	9	10					
<b>Physical</b>															
pre	8	12	8	9	11	8	9	9	11	11	9.6	1.5	12.5	10	0.10<p<0.20
post	7	13	9	10	9	11	13	13	10	13	10.8	2.1			
<b>Psychological</b>															
pre	7	7	7	8	8	9	8	8	7	9	7.8	0.8	9	9	0.10<p<0.20
post	6	12	8	9	7	9	11	14	10	8	9.4	2.4			
<b>Social</b>															
pre	12	12	10	12	13	11	11	12	13	8	11.4	1.5	5	8	0.05<p<0.10
post	11	13	9	12	15	14	15	13	13	15	13	1.9			
<b>Overall</b>															
pre	27	31	25	29	32	28	28	29	31	28	28.8	2.1	6.5	10	0.02<p<0.05
post	24	38	26	31	31	34	39	40	33	36	33.2	5.3			

SD: Standard Deviation

Physical: Physical health, energy, ability to do chores, ability to do things for fun

Psychological: Mood, memory, self as a whole, life as a whole

Social: Living situation, money, family, marriage, friends

The Wilcoxon's W is the test statistics.

For the wilcoxon signed-rank test, if the sample size<100, the p-value is given as a range.

**Table 2:** Comparison of summation domain and overall scores per patient, with total mean, SD and p-value for patients

	Summated score by caregivers										MEAN	SD	Wilcoxon's W	n	p-value
	1	2	3	4	5	6	7	8	9	10					
<b>Physical</b>															
pre	6	9	10	4	11	9	7	9	10	12	8.7	2.4	5	6	p>0.2
post	6	10	10	5	10	9	10	14	9	12	9.5	2.6			
<b>Psychological</b>															
pre	7	9	5	7	8	8	8	8	9	10	7.9	1.4	6	7	p>0.2
post	7	10	9	7	8	9	12	11	7	9	8.9	1.7			
<b>Social</b>															
pre	12	11	10	12	13	14	12	12	13	9	11.8	1.5	15	10	p>0.2
post	13	14	13	14	12	12	17	13	8	15	13.1	2.3			
<b>Overall</b>															
pre	25	29	25	23	32	31	27	29	32	31	28.4	3.2	12.5	10	0.10<p<0.20
post	26	34	32	26	30	30	39	38	24	36	31.5	5.2			

SD: Standard Deviation

Caregiver's score refer to their perception of a patient's score in each of the items.

Physical: Physical health, energy, ability to do chores, ability to do things for fun

Psychological: Mood, memory, self as a whole, life as a whole

Social: Living situation, money, family, marriage, friends

The wilcoxon's W is the test statistics.

For the wilcoxon signed-rank test, if the sample size<100, the p value is given as a range.

**Table 3:** Comparison of summation domain and overall scores per patient, with total mean, SD and p-value for caregivers.

significant. Table 3 repeats this analysis for caregivers' perception of patient's scores and unfortunately, none of the domains' or the overall score was statistically significant.

Our results prove that even in a small study population, a creative dance movement programme results in overall improvement in ADQoL scores for patients. Our results are also suggestive of improvement in the individual items for both patients and caregivers, but our study was not powered to achieve statistical significance. We feel our results are in agreement with comparable previous studies which have shown that dance therapy is associated with some benefit in communication skills, mood and cognition in dementia patients (with evidence more established in non-dementia patients) [4,11,19-21], and that these benefits may be independent from benefits derived from physical exertion and social interaction.

However, good quality studies evaluating creative dance movements specifically in dementia patients, and their impact on the different domains in both patients and caregivers are lacking. One study evaluated change in mood and behaviour but also included observers [11]. A second study, which was an RCT (Randomized Control Trial), while extensively assessing multiple domains such as psychosocial assessments, cognitive function and emotional states, did not include moderate and severe dementia patients and its dance therapy interventions included games and time for social interaction, which may have confounded the results [12]. The last study was performed in a Western population, and although it showed small improvements in some aspects of cognitive functions and self, improvements were modest [21].

We have performed a study of a creative dance movement programme in a local Asian population, assessing the impact on multiple domains on patients, as perceived by both patients and caregivers. However, we acknowledge that our study size was small, and we would like to include cognitive assessments in future studies. However, we still believe that our study findings are useful and should be considered by care providers of dementia patients as it has been shown to be beneficial.

## Conclusions

Our results prove that even in a small study population, a creative dance movement programme results in overall improvement in ADQoL scores for patients with mild to moderate dementia in an Asian setting.

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