

Sheridan

Centre for
Elder Research

Dancing with Parkinson's:
*A pilot evaluation of a specialized dance
program for individuals with Parkinson's*

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About the Sheridan Centre for Elder Research

The Centre for Elder Research conducts innovative Lab to Life® research that enhances the quality of life of older adults while serving as an education and research hub for Sheridan and the broader community.

The Centre for Elder Research was launched in 2003 at the Oakville, Ontario campus of Sheridan College. The Centre has an established track record in applied research and a reputation as a leader that challenges traditional thinking, creating possibilities that transcend historical boundaries.

The applied research conducted at the Centre has contributed to the implementation and evaluation of programming at all levels of society, from the general public, to industry partners, all the way to regional and municipal policy-makers.

Embracing an interdisciplinary approach and, working with faculty and staff from all departments of the college, the Centre is able to directly support the scholarship of teaching and learning at Sheridan, enhancing the student experience and giving all students the opportunity to broaden their horizons through applied research.

Our applied focus, Sheridan's institutional strengths and our strong network of community and industry stakeholders positions the Centre to ensure that knowledge is effectively translated into goods, services, programs and policies that directly benefit older adults and their families.

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The Centre for Elder Research partnered with Dancing with Parkinson's Canada to offer (and evaluate) a dance program for individuals with Parkinson's Disease. Prior to, and following the completion of, the 12-week program (where participants attended hour-long classes twice a week), each participant completed a battery of assessments to evaluate the physical, emotional and psychosocial impact of the dance classes. The participants and dance teachers were also asked to share their impressions of the program through regular journaling and debriefing interviews at the conclusion of the program. While specific challenges related to the assessments and testing procedures for individuals with Parkinson's were identified, the overall impact of the program was extremely positive, with both the participants and teachers reporting marked improvements in a variety of areas. This lends support to the idea that dance can be an effective and engaging health promotion and therapeutic strategy for individuals suffering from chronic conditions such as Parkinson's Disease.

1. Introduction

1.1 An aging population

Population aging is a defining characteristic of the times in which we live. In 2011, an estimated five million Canadians were 65+; that number is expected to double to reach 10.4 million by 2036. By 2051, about one in four Canadians is expected to be 65+ (Human Resources and Skills Development Canada, 2011). An aging Canadian population presents both opportunities as well as significant challenges to our health care system. Lower levels of physical activity, cognitive stimulation, and social interaction among many older adults may contribute to the development of multiple chronic health conditions with most individuals 65+ reporting at least one chronic condition. In the Canadian Survey of Experiences with Primary Health Care (2008), three out of every four Canadians 65+ (76%) reported having at least one of a list of 11 chronic health conditions compared with one in every two adults age 45-64 (48%). Innovative initiatives to support healthy, resilient aging, particularly for those dealing with chronic health conditions, are of the utmost importance to maintain a high quality of life for older Canadians. One such initiative is the use of dance as a health promotion strategy.

1.2 The benefits of dance

Murcia et al. (2010) asked 475 non-professional adult dancers to complete an online survey exploring their perceptions about the benefits of dance. Among the many reported benefits, respondents perceived dance to be a multidimensional activity, positively impacting mood, physical well-being, self-esteem and socialization. The finding related to socialization is noteworthy in that social activity and support have been related to better cognitive function (Krueger et al., 2009). A recent meta-analysis has demonstrated that social disconnectedness in seniors is detrimental to health and can have the same mortality risk as obesity and lack of physical activity (Holt-Lundstad et al., 2010). As such, an intervention such as dance that targets social, cognitive and physical aspects may reduce several risk factors for decline in an older population.

In terms of physical outcomes, McKinley et al. (2008) have demonstrated that an Argentine tango-based program improved balance and walking speed more than a walking program did, and the same type of dance program can also contribute to reduced fall risk in older adults with visual impairments (Hackney et al., 2015). However, dance could provide additional benefits; physical exercise has been suggested as a potential strategy for improving cognitive function in older adults and has been shown to result in significant differences on standard cognitive tests when compared to a control group that was not exercising (Williamson et al., 2009). Similarly, Kattenstroth et al. (2013) found a wide spectrum of benefits for participants in a 1-hour/week dance program, including posture, reaction time, cognition, tactile function and subjective well-being, when compared to a matched control group.

On a related note, a recent study by Kimura and Hozumi (2012) directly compared the effects of an aerobic dance program on adults aged 65-75 years and demonstrated that a 'combination style' group that performed a choreographed routine had a decreased switch cost (mental flexibility) compared to the 'free style' group (no routine), suggesting

that there may be a specific cognitive (executive function) benefit inherent in the act of learning a choreographed routine as opposed to simply repeating the same steps.

1.3 Parkinson's Disease

Parkinson's Disease (PD) is a progressive neurodegenerative movement disorder that is often accompanied by impaired balance and walking, muscular rigidity, tremors and other symptoms that can affect quality of life. While the field is relatively new, there is an increasing amount of interest in the potential for dance as a therapeutic approach for individuals with PD (Earhart, 2009). Previous work in this area has shown that dance classes, specifically tango, can have significant benefits for individuals with PD (Hackney et al., 2007), and more general dance/movement therapy classes can also confer benefits on the participants (Westbrook et al., 1989). A recent meta-analysis found that music-based movement therapy (which included music training and dance classes) showed great promise for improving gait and gait-related activities in individuals with PD (de Dreu & van der Wilk, 2012). As more groups begin offering dance classes for individuals with PD (Westheimer, 2008), it is expected that interest in this field will grow, especially since the evidence to date suggests an important role for dance in the treatment of chronic diseases such as PD.

1.4 Current Project

Recognizing that dance-based movement programs can have a meaningful impact on the health and well-being of older adults, particularly those with chronic conditions such as PD, the Centre for Elder Research partnered with Dancing With Parkinson's Canada (DWP) to conduct a research project to explore the effects of twice-weekly dance classes on individuals with PD. Specifically, the project investigated the physical, emotional and psychosocial effects of 12 weeks of dance classes led by trained professionals who have experience modifying dance classes and choreography in ways that address the physical symptoms, as well as the social and psychological stressors, related to PD.

Interestingly, this work is very well aligned with current Ontario provincial priorities. One of the key recommendations from *Living Longer, Living Well: Highlights and Key Recommendations* (by Dr. Samir Sinha), released January 2013 in Ontario was the following: "The Ministry of Health and Long-Term Care should increase the availability of accessible exercise, falls prevention, and health promotion classes across the province." A dance-based program, which represents one way to promote health and well-being for older adults, supports and works towards this goal.

2. Methodology

2.1 Sample and procedures

This study was open to both men and women 55+ living with PD. There were no other specific inclusion or exclusion criteria, and the class was open to the individual's care partner and/or spouse as well. Participants were recruited through both the Centre's and DWP's email distribution lists and social media channels. A total of 9 individuals

registered for the program (4 males; average age 70.1); two spouses also indicated that they would be joining the classes.

All participants were invited to a pre-program meeting at the Centre. During this interview, participants provided informed consent to take part in the study¹ and learned more about the planned class structure (hour-long classes, twice weekly on Mondays and Thursdays, for 12 weeks in the Centre's dance studio). The classes were taught by two professional dance teachers from DWP using their well-established activities and curriculum.

2.2 Measures used

At both the pre-program meeting and again following the 12-week program participants completed a battery of assessments and questionnaires. This battery was designed to determine if there were any physical, emotional and/or psychosocial changes that occurred as a result of the dance program. Each measurement tool and its purpose are described below:

Participant History Questionnaire: This questionnaire asks basic demographic information and details about the participant's overall health and specific Parkinson's diagnosis, symptoms and current treatment(s).

Participant Pre/Post Questionnaire: This questionnaire asks participants to rate their general health, energy levels, stress and anxiety (among other things) on scales from 1-7 so as to be able to more objectively evaluate any changes following the completion of the program.

Positive Affect Negative Affect Scale (PANAS) (Watson, Clark & Tellegen, 1988, *J. of Personality and Soc. Psych*): Participants are given 20 positive and negative emotional states or feelings and asked to rate to what extent they have felt this way recently.

World Health Organization (WHO) Quality of Life Questionnaire (World Health Organization, 2004): This questionnaire evaluates quality of life on a number of dimensions, including health, emotional well-being and environmental supports.

Activities-specific Balance Confidence (ABC) Scale (Powell & Myers, 1995, *J. Gerontol Med Sci*): Participants are asked to rate their confidence in their balance for a variety of activities and scenarios.

Four Step Square Test (Dite & Temple, 2002, *Arch Phys Med Rehabil*): This test evaluates agility by requiring participants to follow a complex stepping pattern as quickly as possible.

Berg Balance Scale (Bereg et al., 1992, *Can J Public Health*): This scale measures an older adult's impairment in balance function using functional tasks that are static and dynamic in nature.

Senior Fitness Test Kit (Rikli & Jones, 2001, *Human Kinetics*): Participants are tested on 6 separate tests that measure arm and leg strength, flexibility and aerobic endurance.

Participants were asked to keep a journal throughout the program to document their thoughts and any other impacts of the program on their daily lives. They were provided

¹ This study was approved by the Sheridan Research Ethics Board (REB)

with guidelines to help prompt their journal-writing; these included questions about their perceived level of exertion each class, their sleep patterns and their level of enjoyment (please refer to Appendix A).

The dance teachers also kept notes through the program and participated in a debriefing phone meeting where they shared their thoughts.

3. Results

3.1 Participant Results

3.1.1 Demographics

Of the 9 participants that initially registered for the program only 5 completed the entire program and the post-measures (and only one spouse attended a handful of classes). These 5 participants (2 males; average age 72) had been diagnosed with PD between 4-18 years previously and presented with a very wide range of symptoms (both in terms of type and severity). Furthermore, the nature and impact of each individual's symptoms varied daily, making it extremely difficult to both administer the complete assessment battery and to draw conclusions about average changes that occurred as a result of the program. Often the participants self-identified as having "a bad day today", and unfortunately, if these bad days fell on a scheduled testing day, it impacted the research team's ability to conduct the tests consistently (and also impacted the self-report measurements). As such, select results will be presented in a more descriptive style, taking into account the unique circumstances that impacted the data collection.

3.1.2 Physical changes

The three participants who were able to complete the two-minute step test (as part of the Senior Fitness Test Kit) improved their step counts by 19-22 steps each. The four participants who completed the chair stand and arm curl tests also increased their repetitions by 0.75 and 2 respectively. Combined, these results suggest modest improvements in both aerobic capacity and muscular strength following the dance program. The tests of flexibility (measured by the sit-and-reach and back-scratch tests) showed varying results, with leg flexibility increasing (by 1.4 inches on average) but shoulder flexibility decreasing (by 2.4 inches).

3.1.3 Self-report measures

The Activities-Specific Balance scale contains 16 questions about balance confidence; 15 of them showed varied responses, with some participants rating their confidence as higher and others as lower following the dance program. However, the single question where all participants rated their confidence as being higher following the dance classes was the one where they rated their confidence in their ability to walk outside on icy sidewalks. Participants rated themselves as (on average) 30% more confident under those conditions. The PANAS showed no changes in emotional affect (positive or negative), the WHO-QOL showed no overall changes in quality of life and the ratings of stress levels, sleep, socialization and symptom severity also showed no changes.

3.1.4 Participant Journals

Each participant kept a journal during the project and their feedback has been grouped thematically for the purposes of this section.

3.1.4.1 Initial expectations and continued motivation. Initially, the participants' expectations of the program were high; they were following physical activity recommendations from their physicians, believed that they would learn more since this was a small class and expected that they might be able to transfer the newly learned movements to other activities (such as walking or improving their overall physical movement ability). The teachers also played a meaningful role in their continued motivation and enjoyment; the teachers "are very nice", and "really try to get you involved and I like it". The music selection was also reported to be "uplifting and happy", which likely also led to greater levels of enjoyment. In addition, participants reported that they wanted to be an encouragement to others, specifically by presenting their best self in public. The classes left them with high energy levels, and these helped them to continue pushing themselves. As one participant said, "I push myself – I was comfortable with new things because I want to do well".

3.1.4.2 Program-specific benefits. The list below shows the major areas in which the participants reported benefits as a result of the program.

- memory and learning: the classes provided an educational and learning element, specifically in terms of "muscle memory", where they could just enjoy the dance without feeling like they were working, and in terms of learning specific choreography
- movement patterns: the emphasis on maintaining a rhythm, keeping eye contact, transferring weight effectively, practicing side-to-side walking (as opposed to just forward walking) and using dance as a medium of communication helped participants improve their overall movement patterns and understand how movement could be poetic and soft, connecting "self and world"
- physical benefits: some participants reported improvements in stress levels and sleep patterns, as well as improvements in strength and balance. They also said it "helps when I remember to move more" and this impacted their daily lives more broadly

3.1.4.3 Post-program reflections. Before each class, the participants typically reported feeling stiff, that they "couldn't move as much" and "felt slow". However, following the class (and the program in general) they felt loose and "quicker"; they "had more movement at the end", could "move better" and would "feel better". They enjoyed coming to the class, got a good workout and were tired, but relaxed and content. At the end of the program, the participants believed "the program needs to continue", and that "it was fun". They felt that dancing made a difference in their lives, they felt better and would recommend the class to other individuals living with PD. They did however identify that travelling to the program depended on wheel-trans availability and general accessibility; the college campus was a very accessible

location, so this would have to be taken into consideration when planning the program elsewhere.

3.2 Dance teacher reflections

The two dance teachers shared their thoughts and impressions of the class in a debriefing meeting with the researchers following the conclusion of the program. Their comments fall under three broad areas: impact of twice-weekly classes, wide-ranging improvements, and participant-specific strategies.

3.2.1 Impact of twice-weekly classes

At first, the teachers were concerned about the twice-weekly schedule as they had never done that with a group before. They worried it might be too physically grueling and/or challenging (i.e. in terms of transportation) for the participants. However, none of these concerns materialized and they surprised themselves with how much they accomplished and “how great it was”. Meeting with the group twice per week gave them the chance to focus on “what is movement for me” with the participants, really emphasizing what it meant to respond to a new movement paradigm. They felt that the extra attention (and the fact that this was a small group) really supported extreme improvement, more than either of the teachers had seen previously. This occurred, in part, because the tone and choreography of the class was tailored to the students more than it would have been otherwise, giving each participant the support they needed to address their unique challenges. The frequent meeting of the small group created a “safety net” and a feeling of confidentiality and intimacy that also contributed to the observed improvements. The teachers also commented that since this was a research project, and the Centre staff took care of all the logistics (i.e. preparing the room, providing water for the participants, etc.), the teachers were able to devote more energy to the program saying that, “when teachers are in a position to do what they do best, they can really cater to each client’s needs”.

3.2.2 Wide-ranging improvements

These teachers had both taught individuals with PD before and they were “blown away by the improvement in mood and in movement”. While they expected improvements, this group really surpassed their expectations, showing improvements in expression, range of motion, rhythm and overall use of space. One participant had been taking dance classes elsewhere but saw greater improvements during this 12-week period than he had in the previous year and a half. The teachers mentioned that this particular dance studio, with its large windows to bring in plenty of light also helped the participants “explore and move”, using the space more effectively, “giving them back the sense of humanity of being closer to people”.

3.2.3 Participant-specific strategies

The teachers felt that any qualified teacher should be able to address the different stages of disease, especially if they modify the movements to give everyone a sense of mastery while still being challenged and use verbal cues to really encourage people. This kind of class “gives them a safe sense of control in an artistic medium”, and everyone needs confidence and control in their movement, so the exercises can work

for all individuals with PD. In general they found that this group of participants were very educated and knew what worked for them, so this led to some resistance and a refusal to acknowledge that the program was helping them. However, an emphasis on moving through space and how this makes a difference for daily life helped them overcome this psychological defense and admit the benefit of the class. Another participant had a significant delay in her speech which seemed to influence her movement quality, suggesting that “perhaps psychologically her movement took the pace of her speech”. Giving her the right feedback to dissociate the two really made a difference and she showed great improvements with this approach.

4. Discussion

In partnership with Dancing with Parkinson’s Canada, the Centre for Elder Research set out to evaluate the impact of a 12-week dance program on individuals living with Parkinson’s Disease. Specifically, we were interested in the physical, emotional and psychosocial effects of 12 weeks of dance classes led by trained professionals who have experience modifying classes for individuals with PD. Using data from the 5 participants who completed the entire program it is interesting to note where the most meaningful changes were observed and how these could be expanded upon in future studies.

Firstly, it is important to reiterate the challenge of having participants complete the entire assessment battery. With the varied nature of PD, on “bad days” participants were unable to complete the physical measures and this also impacted their answers on self-report measures. This presented a tremendous challenge in terms of data reporting and analysis. With incomplete data sets from such a small sample (n=5) it is nearly impossible to make any claims about the overall results of the program as measured by our assessment tools. There are two different factors at play here that should be considered and addressed in future.

The first factor has to do with the participants themselves. While it is difficult logistically, if at all possible each participant should be given as much flexibility as possible when they have to come in for any assessments. It does both the participant and the researcher a disservice if the collected data are incomplete because of a “bad day” and so, every effort should be made to evaluate these individuals on days where they feel up to the task. The second factor is more difficult to address but is equally important. When one compares the results from the assessments to the feedback from the journals in the present study, there are some similarities (i.e. reported improvements in strength match the physical results), but the journals identify improvements in domains that were not evaluated by the formal assessment tools. For instance, improvements in eye contact, weight transfer, side-to-side walking and “better” movement quality were not directly measured by the assessment battery. The feedback from the teachers also described broader changes (such as expression and use of space) that were not captured very well. This does not mean that tools do not exist to evaluate these sorts of changes (and the Centre does not possess all the equipment required, such a force plate, that could collect appropriate baseline measurements), but it speaks to the wide range of potential benefits that could be observed with such a program. When evaluating improvements in

conditions as complex and variable as PD it is vitally important to select the right range of assessments that can adequately capture any changes that occur as a result of the intervention and be clear about what the expected changes in those assessment measurements might be.

In spite of these aforementioned challenges, the data from this study do show improvements (both qualitatively and quantitatively in a wide range of physical, emotional and psychosocial areas) following the 12-week dance program, and participant enjoyment was high. The participant-reported benefits align with the changes observed by the dance teachers as well, indicating that professional teachers who have experience with individuals with PD are well-positioned to effectively modify the class to address and monitor each participant's individual challenges or weaknesses. Given the positive feedback, this type of an intervention could be used broadly to help individuals with PD even though they may present with a wider range of symptoms and abilities.

While this study was limited in terms of size, there is also one other important limitation to discuss, and that is the fact that this dance program was conducted with the support of a research team. Both the participants and the dance teachers mentioned that the location (i.e. on a college campus with dedicated research staff on hand) helped with the logistical elements of room preparation and transportation and allowed the classes to run smoothly. This would, obviously, not be the case for all community-based programs and could potentially impact the quality of the program if the teachers were responsible for some of those additional considerations. As such, the level of engagement described by the teachers in this study (and its subsequent impact on participants) may be slightly inflated. Of course, this is not to say that teachers elsewhere would be any less engaged, however, it is important to note that removing logistical barriers can allow the teachers to focus on their students and develop more detailed classes and therapeutic approaches.

5. Conclusions and Recommendations

In summary, the results of the 12-week, twice weekly dance program for individuals with Parkinson's was successful and resulted in observed and self-reported benefits for all participants. This type of programming could have meaningful benefits for individuals suffering from PD and should be implemented more broadly in the community. Specific recommendations based on the outcomes of this study could ensure that this program is maximally impactful for all involved.

- 1) Consider the diversity of the participant population (in terms of their PD diagnosis and symptoms) and set up the classes accordingly. For instance, a brief needs assessment could indicate if the target group, on the whole, felt "better" in the mornings or in the afternoons. Making these sorts of small changes to cater to the local group could increase adherence to the program, enhancing the outcome.
- 2) Conducting pre- and post-assessments to evaluate the impact of the program can be valuable, even if not in the context of a formal research project. However, it is important to be mindful of what exactly is under investigation and pick the best

tool(s) for the job. Not all tools will speak to the real-world benefits of the program, and so careful consideration of what the best measures would be could ensure maximal use from the assessment process.

- 3) Location really does matter. Consider the accessibility, convenience and logistical support available at any potential location before hosting the program there. Even small barriers can present a challenge for both the participants and the teachers, and so removing as many of those as possible will improve the final delivery of the program.

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7. Appendix A – Journal guidelines

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Dancing for Parkinson's

Please take a moment to reflect upon some of the experiences you had during each class. Your responses will remain confidential, so please feel free to be candid. At the end of the 12 weeks of class please submit your journal to Lia Tsotsos.

Suggested Journal Topics:

How did you feel before, during and at the end of each class?

What motivates you to continue to attend this class?

On a scale from 1-10, how hard do you feel you are pushing yourself in each class? What, on a daily basis, influences how hard you push yourself?

Was the class fun and enjoyable? What made it fun and enjoyable?

How do you feel that participation in this class has affected your daily life?

How do you feel that participation in this class has affected your sleep patterns or your stress levels?

How do you feel that participation in this class has affected the way you take care of yourself on a regular basis?

Would you participate in a class like this in the future? Why or why not?

How would you improve this class?

Would you recommend this class to your friends or family? Why or why not?

Please write in this journal as much and as often as you would like.

If you need an additional journal, please contact Lia Tsotsos at 905-845-9430, extension 2407.

Thank you for your participation!