


Practice Brief

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Paving the Path to Wellness for Stroke Survivors: A Lifestyle Medicine Group Intervention

Abstract: *Background:* Stroke is the leading cause of disability and the second-most leading cause of mortality. Stroke has both physical and psychological impact on the lives of stroke survivors. Lifestyle modifications have a pivotal role in post-stroke management care. The Paving the Path to Wellness Program (PPWP) is a 12-week program offered to stroke survivors at Spaulding Rehabilitation Center following discharge. The program encompasses the following domains: physical activity, nutrition, stress management, time-outs, energy, sleep, purpose, and social connections. *Objective:* The purpose of this pilot study was to evaluate the effectiveness of the PPWP on the recovery of stroke survivors. *Methods:* Three stroke survivors who participated in the program were interviewed following completion of the program. *Results:* The results showed the PPWP had a positive impact on physical health (e.g., increased physical activity, weight loss, nutrition awareness, and better stress management); helped to create a new purpose (e.g., happiness,

satisfaction, and well-being); and improved the social life of the participants (better awareness and importance of friends and family). Conclusions: Next steps are to study this program in a larger stroke population and examine long-term effects.

population²; the rate of recurrent stroke ranged between 5% and 51%³ every year in the US.¹ Stroke has a significant impact on both physical and psychological aspects of the survivors and their families,⁴⁻⁶ and post-stroke rehabilitation needs to facilitate

 “Our data confirmed that the PPWP improved awareness and value of quality connections with family and friends.” 

Keywords: stroke; physical activity; nutrition; stress; lifestyle; purpose; social connections

Introduction

Stroke is the leading cause of disability in the US¹ and the second-leading cause of death worldwide (11.13% of mortalities). Stroke survivors have a 15-fold risk of having a second stroke compared to the general

medical, psychological, and functional recovery.

A post-stroke rehabilitation program should address the lifestyle factors that led to stroke⁷ through lifestyle modification.¹ Maintaining the same lifestyle (e.g., unhealthy diet, lack of exercise, and stressful work) increases the chances of stroke recurrence. Accordingly, an integral part of the rehabilitation process should be coaching people to adopt healthy lifestyles to help address the issue of a secondary

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stroke.² There is a paucity of studies examining the benefit of lifestyle medicine interventions in patients post-stroke. Previous studies have included either a counselling intervention alone⁸ or group intervention to target diet and physical activity advice alone,⁹ but not both. The Paving the Path to Wellness Program (PPWP)¹⁰ is a group lifestyle management program to increase the well-being of stroke survivors, improve their quality of life, and indirectly reduce their chances of having a second stroke. The program also addresses the areas of physical rehabilitation, psychological recovery, and reintegration to society and motivates and promotes a sense of connection in participants.

The program recommends focusing on whole-food plant-predominant eating, walking 150 min per week, sleeping 7-9 h, and stress reduction 5-20 min per day. The 4-month PPWP (see [Appendix B](#)) is focused on improving physical health, stress management, time-outs, energy, purpose, sleep, and social connection. The PPWP was developed by Dr Elizabeth Frates¹¹⁻¹³ to help stroke survivors recover after their discharge from the hospital. This case series evaluated the efficacy and impact of the PPWP. We hypothesized that the PPWP (1) will improve the stroke survivors' physical condition in terms of increased exercise, healthier eating, and better sleeping; (2) will help renew the purpose of life; and (3) will improve connections with family, friends, and the community.

Methods

This study was a qualitative investigation consisting of semi-structured interviews with stroke survivors at the Spaulding Rehabilitation Hospital in Boston, MA. This study was declared exempt by the Harvard Institutional Review Board. The interview was conducted

by the program assistant and a student at the Harvard Extension School. The three participants who signed an informed consent had a mild stroke and did not require physical assistance. The inclusion criteria were a stroke within the previous year, attended the Spaulding Rehabilitation Hospital, a score of 7 (complete independence) or 6 (requires use of a device but not physical assistance) on the Functional Independence Measure (FIM), sufficient cognitive abilities to complete the interviews as judged by the clinicians, fluency in English language,¹⁴ and minimum attendance of 10/12 PPWP sessions.

Procedures

The participants sat for a 2-hour lecture/discussion twelve times in four months. All interviews (1-hour duration) were conducted immediately after the completion of the last session of the PPWP. All participants were permitted to ask questions or skip any question that they did not feel comfortable with and could stop the interview at any time. Semi-structured interviews were conducted between December 2017 and February 2018. The interview questions were open-ended and asked the participants to compare their situation before and after the program in the various topics covered by the PPWP.

Data Analysis

A grounded theory approach was used for thematic analysis. The audio files of the recorded interviews were transcribed to conduct the thematic analysis using NVivo 12 Pro Qualitative Analysis Software, QSR International Pty Ltd, Version 12 Pro, 2018.

Results

Setup Cases and Code Themes

The three interviews were conducted and the participants'

demographic information was obtained ([Table 1](#)). Three initial nodes based on our hypotheses were created: health, purpose, and social ([Table 2](#)).

Query and Visualize

NVivo (2018) recommends the following steps to analyze the data: (1) Word frequency by nodes; (2) Word tree of most frequent words in each node; and (3) Framework matrix by participant and node.

Health Node Analysis

A word frequency search within the participants' answers to the questions included in the Health node showed that the 10 top words were determined to be sufficient to give an accurate picture of the interviews, given that the study included three interviews in total.

A word cloud of the 10 most frequent words mentioned by the interviewees was also generated ([Figure 1](#)). Two words emerged as most frequently used: walking and sleep. Walking is the preferred mode of exercise by the participants. They also often referred to sleep problems and how important sleep was in their recovery.

Health, Sub-Node Walking

P1 was very physically active before his stroke. After the stroke, he stopped exercising and consequently gained 30 pounds. The PPWP made him more aware of the importance of being physically active. His exercise now is mostly vigorous walking, and he is back to his pre-stroke weight. P2 walked moderately before the stroke. After the program, he admits that he now exercises regularly. He attends a gym and walks more regularly. He declared that the PPWP made him more aware of the benefits of exercising. Finally, P3 practiced mild exercise, such as walking, prior to the stroke. P3 now practices different types of physical activities: yoga, tai

Table 1.

Description of Participants.

Participant 1 (P1)	Participant 2 (P2)	Participant 3 (P3)
Age: 59 years	Age: 74 years	Age: 65 years
Gender: Male	Gender: Male	Gender: Female
Education level: Master's in Education	Education level: Master's in Electrical Engineering, working toward an MBA and a PhD	Education level: Master's in Education
Occupation: Retired teacher	Occupation: Consultant in energy area, high voltage grid, smart grid area	Occupation: Special needs teacher
Type of stroke: Hemorrhagic	Type of stroke: Hemorrhagic	Type of stroke: Hemorrhagic
Date of stroke: 2012	Date of stroke: Dec 2014	Date of stroke: Jan 2015
Smoke: No	Smoke: No	Smoke: No
Alcohol use: Moderately	Alcohol use: Moderately	Alcohol use: Moderately
Lives with spouse	Lives with spouse	Lives alone
Religious: Yes	Religious: No answer	Religious: Yes
Ethnicity: Caucasian	Ethnicity: Middle-Eastern	Ethnicity: Caucasian

Table 2.

Relationship Between Node Themes and Interview Questions.

Node Theme	Interview Questions
Health	Q2 Stress, Q4 Energy, Q6 Sleep, Q8 Exercise, Q9 Nutrition
Purpose	Q5 Purpose
Social	Q7 Social

chi, and swimming. She is a very social person and enjoys exercising with other people.

Health, Sub-Node Sleep

The three participants were aware of the importance of sleep for their well-being. P1 mentioned that the PPWP made him more aware of the benefits of having a sleeping routine. P2 also referred to taking naps

during the day because of the PPWP. Finally, P3 had already paid great attention to the quality of her sleep before and after the PPWP.

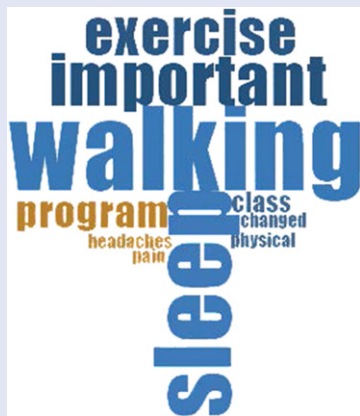
Sub-Node Others

There are other areas mentioned by the participants where the PPWP was beneficial for them. One area was meditation. P1 mentioned that he now does more meditation after

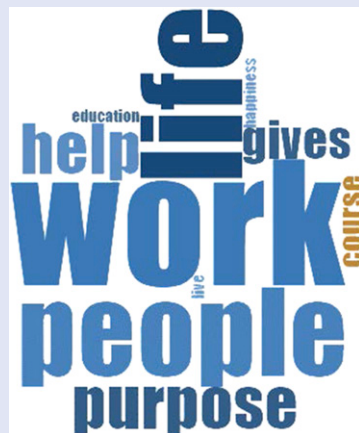
the PPWP and that the program helped him manage his stress, a serious problem he had before the stroke. Both P2 and P3 now also do more meditation after the PPWP. Nutrition is another area where the PPWP has had a positive influence. The participants stated that they are now more aware of the importance of healthy nutrition for their well-being.

Figure 1.

Word cloud for the Health node.

**Figure 2.**

Word cloud Purpose node.

**Figure 3.**

Word cloud Social node.



Purpose Node Analysis

The most frequent words in the Purpose node were work, life, and people (Figures 2 and 3). Work was a source of meaning for P1 pre-stroke and rediscovering a new meaning post-stroke involved finding an activity that made him feel useful. The big question for him was how the stroke was going to affect his life and how he could create a new meaning for his life after the stroke.

Sub-Node Life

P1 mentions how the PPWP made him realize how many positive things he could do with his life, post-stroke. In the Life Satisfaction 1-10 scale, P1 goes from 7.5 before the PPWP to 9 after the PPWP. The Happiness scale also shows a significant improvement, from 8 to 9.5. P2 does not show significant changes in both scales before and after the PPWP. He declares a small improvement in life satisfaction, from 7 to 8 after the PPWP, while the happiness scale remains unchanged at 7. This result could have been related to his personality as he was less expressive and more reserved during the program. P3 declared that her life purpose has shifted from caring for others to paying more

attention to her well-being. Her Life Satisfaction scale showed a significant improvement from 6 or 7 before the PPWP to 10 after the PPWP. Similarly, the Happiness scale went from 4 to 5 to 10 after the PPWP.

Sub-Node People

Both P1 and P3 mentioned the importance of other people in their lives, whether family members, friends, or the community. P1 focuses on service to others as a new source of meaning. P3 recognizes the importance of others and plans to participate in the peer visitor program, although she prefers to focus on herself right now. P2 did not mention anything relevant in this area, and he appeared to be more reserved and less communicative during the interviews when compared to P1 and P3.

Social Node Analysis

The most frequent words in this node were people, connection, and energy. All participants recognized the importance of people, whether family members or friends, in the recovery and reconstruction of their lives after stroke. They are more aware of and value even more the

relationships with others after the PPWP. Additionally, they are aware that some people draw energy while others give energy.

Sub-Node People

P1 mentioned that his relationship with his spouse was already very good before the stroke, but he was more aware of its value. Regarding friends, he mentioned that the PPWP made him more aware of the importance of friendship in his life. P3 referred to her son as a great support in her life after the stroke. She went from being caregiver for her aunt and her mother to being care-receiver from her son. P2 did not mention any relevant point in this area.

Sub-Node Connections

Social connections are important for both P1 and P3. Both participants are aware of the value of having strong and high-quality connections with others. P2 is less focused on this area, although he seems to recognize that investing time in nurturing a few quality connections is important.

Sub-Node Energy

P1 and P3 are aware of the energy that they can get from their

relationships. They are aware that some people are negative while others can give them energy. P3 mentioned that taking care of her aunt and mother drew energy away from her. P2 did not mention any relevant point in this area.

Discussion

The purpose of this study was to evaluate the effectiveness of the PPWP on the recovery of stroke survivors. The interviews confirmed the three initial hypotheses that the PPWP (1) had a positive impact on physical health and well-being, (2) created a new purpose, and (3) improved the social life of the participants. After the PPWP, participants exercised regularly, with walking being the most common form. Participants were more aware of the food they ate and increased the amount of healthy food in their diets. Finally, they used mindfulness and other techniques to manage their stress. Participants reported varying degrees of improvements in overall life satisfaction, well-being, happiness, and pain.

According to APA Dictionary of Psychology,¹⁵ well-being refers to a good quality of life with low levels of distress and overall good physical and mental health. Lifestyle has been found to be a predictor of stroke and is fundamental to preventing stroke recurrence.^{7,12-14,16,17} The PPWP seems to be effective in positively changing the lifestyle of the stroke survivors. The importance of developing a new life meaning is in line with research that suggests that biographical disruption is a major consequence of chronic diseases.¹⁸⁻²⁰ Finding a new life meaning (as defined by the person) after a stroke is one of the fundamental objectives of

a rehabilitation program and the PPWP was successful in accomplishing that goal.

Social connection is another area that research has found important for a satisfactory recovery after a stroke.²¹ Our data confirmed that the PPWP improved awareness and value of quality connections with family and friends. It is important to consider the role of personality in the recovery of stroke survivors. From our sample, P1 and P3 seemed to have obtained the highest benefit from the PPWP, while P2 seemed to only moderately benefit from the PPWP. Both P1 and P3 had expressive personalities, while P2 was more reserved and less communicative. P2 declared moderate improvements in physical activity and nutrition but not significant changes in life purpose and social life.

This case series provides promising initial results. Future studies should investigate the effects of this program in a larger stroke population and examine long-term effects.

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Supplemental Material

Supplemental material for this article is available online.

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