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Piloting Test of a Mindfulness Meditation Intervention to Reduce Stress in Younger Stroke Patients

Pilotażowy test interwencji świadomej medytacji w redukcji stresu u młodszych pacjentów z udarem mózgu

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Abstract

Introduction. The population of younger people having strokes is growing. Persons who are younger and have a stroke have specific stressors after a stroke that those over 60 may not experience (e.g., ability to earn an income, provide for a family, returning to work, etc.).

Aim. In order to address some of these age-specific stressors, new and novel approaches to stress mediation are needed. In order to address this gap in the literature this study piloted a mindfulness meditation with younger in hospital stroke survivors.

Material and Methods. Prospective non-randomized pilot study of in-hospital stroke patients <60 years of age. Baseline assessment included the Perceived Stress Scale (PSS), heart rate (HR), blood pressure (BP), and respiratory rate (RR). Patients received a 10-minute mindfulness training session with instructions for home use. PSS, HR, BP, and RR were collected immediately after training and telephone assessments of PSS were collected 30-day post discharge.

Results. The mean age of the 21 patients included in the final analysis was 47.4 years. Paired t-test showed statistically significant differences in heart rate ($p < 0.001$) and respiratory rate ($p < 0.001$) before and after the intervention, but no statistically significant differences in pre and post training blood pressure ($p = 0.480$). There was no statistically significant difference in PSS scores before and after the training.

Conclusions. The findings of this study suggest that the mindfulness intervention is feasible for in-hospital stroke patients and shows promise for reducing stress, as indicated by physiologic changes such as lowering heart and blood pressure rates. (JNNS 2019;8(2):48–53)

Key Words: stroke, nursing, meditation, complementary therapies

Streszczenie

Wstęp. Wzrasta populacja młodych ludzi zapadających na udary mózgu. Osoby młodsze w wyniku udaru odczuwają określone czynniki stresogenne, których osoby powyżej 60. roku życia mogą nie doświadczyć (np. zdolność do zarabiania pieniędzy, utrzymanie rodziny, powrót do pracy itp.).

Cel. Aby odnieść się do niektórych z tych specyficznych dla danego wieku czynników stresogennych, potrzebne są nowe i nowatorskie podejścia do mediacji w zakresie stresu. W celu zajęcia się tą luką w literaturze, w badaniu tym przeprowadzono pilotażową świadomą medytację w szpitalu z młodszymi osobami, które przeżyły udar mózgu.

Materiał i metody. Prospektywne, nierandomizowane badanie pilotażowe u pacjentów po udarze mózgu w wieku poniżej 60 lat przeprowadzono w warunkach szpitalnych. Ocena stanu wyjściowego obejmowała skalę postrzeganego stresu (PSS), częstość akcji serca (HR), ciśnienie krwi (BP) i częstość oddechową (RR). Pacjenci otrzymali 10-minutowy trening świadomego myślenia oraz instrukcje wykonywania w warunkach domowych. PSS, HR, BP i RR zebrano natychmiast po przeszkoleniu, a oceny telefoniczne PSS zebrano 30 dni po wypisie ze szpitala.

Wyniki. Średni wiek 21 pacjentów objętych finalną analizą wynosił 47,4 lat. Analiza t-testem wykazała istotne statystycznie różnice w częstości akcji serca ($p < 0,001$) i częstości oddechu ($p < 0,001$) przed i po interwencji, jednakże nie wykazano istotnych statystycznie różnic w ciśnieniu krwi przed i po instruktazie ($p = 0,480$). Nie odnotowano statystycznie istotnej różnicy w wynikach PSS przed i po szkoleniu.

Wnioski. Wyniki tego badania sugerują, że interwencja w zakresie świadomego myślenia jest wykonalna dla pacjentów po udarze mózgu w warunkach szpitalnych i wskazuje na obiecujące możliwości zmniejszenia stresu, na co wskazują zmiany fizjologiczne, takie jak obniżenie częstości akcji serca i ciśnienia krwi. (PNN 2019;8(2):48–53)

Słowa kluczowe: udar mózgu, pielęgniarstwo, medytacja, terapie uzupełniające

Introduction

For stroke survivors, transitioning from being a patient in a hospital to being independent at home can be a significant source of stress. This may be partly related to the uncertainty of their future [1]. The physiological changes and physical challenges experienced by stroke survivors can trigger fears related to loss, as well as real or perceived disruptions in life style. Survivors ruminate about their past abilities, have regret about their current situation, and anticipate a difficult future. Younger survivors, in the prime of their most productive years, may be especially vulnerable when they are suddenly faced with loss of independence and unanticipated demand on limited resources. For these younger stroke survivors, the hospital-to-home transition requires special considerations in stress reduction. In addition, every stroke patient has a different response to perceived stress.

Stress may exacerbate health risk after stroke patients due to external factors [2,3]. One objective of the healthcare team in providing care to younger patients with stroke should include stress reduction. While many stress reduction therapies have been used, mindfulness has several key advantages, such that mindfulness exercises can be performed essentially anywhere, without additional equipment, and no additional cost. These exercises have previously been shown to be effective in reducing stress for patients with cancer, HIV, and psoriasis [4]. The primary purpose of this pilot study was to determine the efficacy of providing a mindfulness intervention to aid the transition of care for young stroke survivors. A secondary aim was to develop data from which to power a future clinical trial to explore the hypothesis that the intervention reduces stress in younger patients after stroke.

Stroke is the leading cause of disability and the fifth leading cause of death in adults in the United States [5,6]. Stroke affects people across race, gender, age, level of education, religion, economic status, and country of origin. Stroke survivors are left to cope with the “new normal” of dealing with sudden physical challenges and psychological effects [7,8]. According to the National Stroke Association, stroke happens when blood flow to and from the brain stops and causes brain cell death. Additionally, approximately 15% of ischemic strokes

occur in younger adults, specifically ages 18–65. The impact of a stroke on a younger person has a longer lasting impact and can be more detrimental in terms of potential to earn an income and ability to return to work [8,9]. Additionally, the overall quality of life for these individuals is impacted by physical, emotional, cognitive, and psychosocial changes. Some studies have shown that these stressors are reduced over time, especially in the younger stroke population, but the time to recovery can be years [9]. Short term interventions are needed to aid younger stroke survivors in managing stressors from the time they are discharged from the hospital.

These challenges could be perceived as more devastating for young people who have had a stroke because of the immediate feelings of the loss of a gainful future and end of life considerations. These perceptions can cause younger survivors significant stress. The American Psychological Association (APA) defines stress as a feeling of being stunned, apprehensive or run-down, and can bring further health damage. In 2015, a report by the APA showed that stress is highest among millennials and generation Xers, as compared to baby boomers and older [10]. When stress accompanies stroke during hospital discharge, it can create a regressive effect on patients post-hospital discharge [11].

The transactional theory of stress states that psychological stress is a product of the individuals and their perceived coping resources, beyond which threatens their well-being [11,12]. Discussions about the new challenges and impairments with stroke survivors are important. Ways to alleviate stress in this population are through: education, support, and other tools that can decrease stress. The clinical and research community may benefit from having a heightened awareness in providing young stroke survivors with resources such as community support groups, online chat, media interface groups (e.g., Facebook groups, Twitter), and assessment tools [8]. Yet, research has fallen short of addressing coping mechanisms and stress reduction tools to teach these young stroke survivors prior to leaving the hospital.

“Mindfulness is the awareness that emerges through attending on purpose and nonjudgmentally to the unfolding of experience moment by moment, and most simply being aware of the present moment” [13,14]. The five basic steps of mindfulness are: 1) set aside time

each day to practice mindfulness, 2) observe the present moment, 3) allow judgements to pass, 4) return to observing the present moment as it is, and 5) know that your mind (thoughts) will wander; be aware of this and work to regain focus. A 2013 systematic review of mindfulness after stroke found some benefit and no harm associated with mindfulness training [15]. Although mindfulness interventions are considered to be easy to complete, low-cost, accessible and flexible and can be used in conjunction with other interventions, the process of being mindful requires daily practice [16].

Mindfulness interventions have been shown to impact a broad range of outcomes in studies performed [17]. The 8-week mindfulness-based stress reduction (MBSR) program, developed by Jon Kabat-Zinn at the University of Massachusetts Medical School, is perhaps the most well-known mindfulness intervention in the scientific literature [18]. However, brief mindfulness meditation interventions have also been developed and some studies have shown that one session of meditation produces positive effects on mood and cognition [19].

The main goal of this study is to determine the effect of a short mindfulness meditation intervention in reducing stress in young stroke patients. Specifically, this study uses the Population — Intervention — Comparator — Outcome — Timing (PICOT) format to address the question: “In young patients with stroke (P), what is the effect of a short mindfulness meditation intervention (I) on reducing stress (O) 30 days after the discharge at home (T)?”.

Material and Methods

This is a prospective non-randomized pilot study of stroke patients ages 18 to 60 years old. Study procedures were approved by the Institutional Review Board at the enrolling University Hospital prior to any study procedures being conducted. Eligible subjects were those admitted to the hospital with a diagnosis of stroke, and expected to discharge home (versus in-patient rehabilitation or long term care). Patients were screened, consented, completed a baseline assessment, provided with a training in mindfulness on ways to lessen stress after a stroke, and completed a telephone assessments at 30-days post discharge. The 10 minute mindfulness training was split into 3 components: 1) background education of mindfulness, 2) perform meditation that includes the five steps of mindfulness, and 3) the feedback. Step two of the mindfulness training was completed at the patient’s bedside. A script was read to the patient which detailed a mindfulness exercise (Figure) [20]. The script was read by a trained member of the research team in a slow, calm voice. The script was also

Begin this meditation by noticing the posture that you are in. Find a relaxed, comfortable position.

- You may be standing or sitting or lying down. Keep your back upright, but not too tight. Hands resting wherever they are comfortable. Your eyes may be open or closed, but you may find it easier to maintain your focus if you close your eyes.

Notice and relax your body.

- See if you can tune in to any sensations that are present to you in your body in this moment. There might be heaviness or lightness, pressure, weight. There might be vibration, pulsating, movement, warmth, coolness, these sensations can be anywhere in your body, and all you have to do is notice them. Notice what is happening with curiosity and interest.

Tune into your breath.

- Feel the natural flow of breath — in, out. As you breathe, relax. Not much to do except be fully present and aware. Notice where you feel your breath in your body. It might be in your abdomen. It may be in your chest or throat or in your nostrils. See if you can feel the sensations of breath, one breath at a time. When one breath ends, the next breath begins.

Be kind to your wandering mind: Now let go of the body’s sensations, and turn your attention to the sounds inside or outside the room.

- There may be all sorts of sounds happening, loud sounds, and quiet sounds. You can also notice the silence between the sounds. But the sounds are coming and going. Now as you do this, you might notice that your mind may start to wander. And then gently redirect your attention right back to the breathing.

Stay here for five minutes.

- Notice your breath, in silence. From time to time, you will get lost in thought, then return to your breath.

Check in before you check out.

- After a few minutes, once again notice your body, your whole body, seated here. Let yourself relax even more deeply and then offer yourself some appreciation for doing this practice today. Take another breath, soften, and when you are ready, you can open your eyes.

Figure. Young Stroke Meditation Exercise.

From: Kabat-Zinn J., Lipworth L., Burney R. The clinical use of mindfulness meditation for the self-regulation of chronic pain. *J Behav Med.* 1985;8(2):163–190

given to patients after the intervention as a guide when completing at home meditation sessions.

The Perceived Stress Scale (PSS) was used to evaluate the patient’s baseline and follow up stress. The PSS scores are on a 5-point scale (0=never to 4=very often) with a total range from 0 to 40. Higher scores suggest higher levels of stress. Physiologic measurements data collected before and after each meditation session of every patient candidate: systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP), heart rate (HR) and respiratory rate (RR).

Results

Of the 23 subjects who consented to participate in the study, 21 completed the intervention. The mean (SD) for subject age was 47.4 (9.5) years (range 27–60) and 12 (52%) were male. Training sessions for the mindfulness interventions lasted 10.2 (2.6) minutes on

average and none lasted longer than 15 minutes. The mean (SD) for the number of sessions completed at home was 7.8 (18.3) sessions (range 4–33); and length of stay was 9.6 (9.2) days (range 1–35). There were 9 subjects lost-to-follow up. There was no significant difference in mean age ($p=0.3827$), nor baseline PSS scores ($p=0.4602$) comparing lost-to-follow-up and those completing follow-up (Table 1).

Paired t-test was used to explore baseline and post-training vital signs and PSS scores. Blood pressure systolic/diastolic (mean) pressures were lower, but not statistically significant before and after the training session (141/85(100) vs 138/84 (99) respectively). Mean heart rate before 71.3 (14) and after 66.4 (12.8) showed a statistically significant difference before and after the training ($p<0.001$). Respiratory rate before 20.0 (3.3) and after 15.5 (3.4) the training session were significant different ($p<0.001$). There was no statistically significant difference in blood pressure before and after the intervention (mean BP, $p=0.480$). There was no difference in PSS scores before or after the training session [(18.8(7.8) vs 17.8(8.1)) respectively; $p=1.0$] (Table 2).

Discussion

The results from this pilot study support the efficacy of a mindfulness intervention to assist the transition of care after stroke for persons under 60 years of age. The recruitment phase for 30 stroke patients between ages 18 and 60 was approximately 8 months, which supported that there is an adequate amount of younger stroke patients being seen in the hospital and discharging home. Those patients that are discharged home may be at risk for higher levels of stress, depression, and lower quality of life [9]. Transition of care interventions should be initiated while the patient is still in the hospital [21]. The mindfulness intervention lasted less than 15 minutes, which supported feasibility of this intervention within the hospital setting.

The secondary aim was to obtain pilot data to explore for differences in hypothesized bio-markers of stress (BP, HR, RR, and PSS). The change in HR and RR suggests an immediate effect associated with the mindfulness intervention. This suggests that a short mindfulness intervention may lower immediate stress in younger stroke survivors. The lack of statistically significant differences in BP and PSS is not surprising, nor seen as a negative outcome. A floor effect exists when values are low and unlikely to be lowered by the intervention [22]. After stroke, patients identified as having hypertension are placed on antihypertensive medications. Neither

Table 1. Characteristics of the study group

Variable	Mean (SD)	Min	Max
Age (years)	47.4 (9.5)	27	60
Hospital length of stay (days)	9.6 (9.2)	1	35
Training time (minutes)	10.2 (2.6)	5	15
Number of sessions completed	7.8 (18.3)	4	33

M — mean; SD — standard deviation

Table 2. Reporting mean (SD) for outcome variables

Variable	Pre	Post	p-value
Blood pressure			
Systolic	140.8 (20.3)	137.6 (19.3)	0.1305
Diastolic	85.1 (13.2)	84.3 (16.5)	0.7019
Mean	99.9 (15.4)	98.8 (16.8)	0.4975
Heart Rate	71.3 (14.0)	66.4 (12.8)	<0.001
Respiratory Rate	20.0 (3.3)	15.5 (3.4)	<0.001
PSS score	18.8 (7.8)	17.8 (8.1)	1.0

PSS — Perceived Stress Scale

antihypertensive use nor antihypertensive administration time (if any) were recorded. Stroke patients diagnosed with hypertension are likely to be on blood pressure altering medications, so a short mindfulness intervention would not overcome pharmacological agents aimed at either lowering or increasing blood pressure. As shown in Table 2, there was a downward trend, and patients with BP>140 were noted to be more likely to have lower BP than those with normotension. Similarly, the PPS scores for patients who are already within a normal blood pressure range (i.e., not presenting with stress at the time the survey was completed) and are not likely to be improved by the intervention. This study showed that the mindfulness intervention may be more beneficial for young stroke patients with hypertension or higher levels of stress upon hospital admission.

Limitations

There were 9 patients that were lost to follow up. This was a larger number than expected and may have impacted the results of this study. Additionally, we had a small sample size so the generalizability of the results requires a larger sample set. The lack of external funding prohibited sophisticated assessment of stress using biomarkers like salivary cortisol. However, this was a pilot and that makes sense so a larger funded trial should try using salivary cortisol.

Conclusions

The findings are positive in that they suggest the use of a mindfulness intervention is not only feasible, but the intervention may have an immediate benefit to reduce stress for short periods. Future research should focus on methods of teaching the intervention, and to explore if specific targeted subgroups (e.g., working mothers or single-parents) benefit more from the intervention.

Implications for Nursing Practice

Nurses have the opportunity to provide patients with both knowledge and skills. The mindfulness intervention was completed in one session that lasted 10-minutes. This short training session provided patients with a new skill to use at home that may help reduce stress. Nurse educators should consider adding curricula that provide nurses with the skills required to teach mindfulness to their patients. Nurses who provide direct care should consider adding mindfulness training sessions to their pre-discharge education packet.

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