

大分県立看護科学大学 第20回看護国際フォーラム

Leadership in nursing research: Evidence based nursing in post-stroke emotional dysfunction

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Received 30 December 2018

Abstract

Nursing science has a clinical-oriented nature, making it indispensable to address health challenges of today and tomorrow. The issues addressed in the nursing research, therefore, are on the aging population with high health risks with relation to the changing health policies. Nursing researchers should aim to achieve health care solutions for the high risk groups and to develop an integrated continuum of care services for the public health, medical science and welfare services. Increasing quality of life (QOL) may be area that need more research attention. In this review, we discussed about various factors including post-stroke depression (PSD), post-stroke emotional incontinence (PSEI), post-stroke anger proneness (PSAP), post-stroke fatigue (PSF), post-stroke sleep disturbances (PSSD) and post-stroke pain (PSP), which were identified to affect stroke survivors' QOL. Moreover, we discussed how the research idea evolves as the time passed by. Nursing researchers should start to build their own database and broaden areas of focus. Given the rise in the number of patients suffering from chronic illnesses, it is critically important for the nursing researchers to focus on improving patients' QOL. Every patient, regardless of their health status, age, gender, race and ethnicity, should be able to achieve and experience his or her highest QOL where the patient is able to successfully manage own health with minimal burden caused by illness-related adverse symptoms. Nursing researchers must employ various methods to answer intriguing questions to achieve evidence-based practice and an integrated continuum of care.

Key words

nursing research, leadership, quality of life, post-stroke, emotional dysfunction

1. Introduction

Nursing science has a strong clinical-oriented nature, making it indispensable for nursing research to address health challenges of today and tomorrow. The issues that the nursing research address, therefore, are the globally aging population with high health risks, the swiftly changing health policies and the shortened average lengths of hospital stays. Nursing researchers should aim to achieve health care solutions for the high risk groups and to develop an integrated continuum of care services for the public health, medical science and welfare services. Furthermore, aims to cut down medical expenses and to increase quality of life (QOL) may be another area that need more research attention.

Given the rise in the number of patients suffering from chronic illnesses, it is critically important for the nursing researchers to focus on improving the QOL for these specific population. Every patient, regardless of their health status, age, gender, race and ethnicity, should be able to achieve and experience his or her highest QOL where the patient is able to successfully manage own health with minimal burden caused by illness-related adverse symptoms. This may perhaps be achievable if patients, families, communities and nurses are equipped with evidence-based strategies in maintaining wellness and preventing illness from occurring in the first place. In this review, we will focus on various factors that were identified to affect stroke survivors' QOL. Moreover, we will

discuss how the research idea had evolved as the time passed by, since we believe that the nursing research leadership is an expansion of ideas. Nursing researchers should start to build their own database and broaden areas of focus.

Stroke is a leading cause of death in many industrialized countries, particularly in the East Asia. Even though patients survive, the stroke patients suffer from its sequels which decrease patient's QOL. About 25% of the stroke survivors may develop stroke-related disabilities (Park and Choi-Kwon 2018). Emotional dysfunction, which occurs commonly after stroke, particularly attenuates recovery from the disease and decreases the QOL (Kim JS 2017). With an increasing number of stroke survivors, more attention and emphasis should be focused on their QOL. Also, considering the fact that the ultimate goal of quality nursing care is to maintain and to improve an individual's QOL, nursing researches are recommended in establishing such goal for the stroke survivors. We previously reported that the post-stroke biobehavioral changes including emotional dysfunction that may have strong and direct influence on the patient's QOL, whereas the nutritional status had an indirect effect. We suggest that in order to improve the stroke survivors' QOL, a comprehensive intervention is necessary to manage post-stroke emotional dysfunction (PSED), which includes post-stroke depression (PSD), post-stroke emotional incontinence (PSEI), post-stroke anger proneness (PSAP), post-stroke fatigue (PSF), post-stroke sleep disturbances (PSSD) and post-stroke pain (PSP; Choi-Kwon et al 2012).

2. Post-stroke depression (PSD) and QOL

Previously, studies have revealed the negative relationship between depression and QOL in stroke patients (Choi-Kwon et al 2006a, Kim JS and Choi-Kwon 2000, Suenkeler et al 2002). Suenkeler et al (2002) assessed stroke survivors at 3, 6, and 12 months after their stroke onset to identify the subjective reporting of health-related QOL and related factors. Despite their

stable neurologic function and disability, stroke survivors subjectively measured their QOL to be continuously deteriorating and worsening as time passed. Patients also tended to become more depressed at 6 and 12 months after the onset despite their stable physical functions. They reported that the more depressed stroke patients were, the lower they perceived their QOL were (Suenkeler et al 2002). PSD, which is the most widely studied among the emotional dysfunctions occurring after stroke, has been reported to be present in around 18% of stroke victims in Korea (Kim JS and Choi-Kwon 2000). The occurrence rate, however, has been reported to be even higher in different countries, ranging from 16% in Korea to 28% or more in Australia (Kim JS and Choi-Kwon 2000). A recent systematic review and meta-analysis study that included 61 observational studies has shown an even higher rate of 31% of stroke survivors (95% CI 28 to 35%) developing PSD at any time-point up to 5 years after the stroke onset (Hackett and Pickles 2014). The wide variation in the frequency of PSD seems to be attributed to the methodological heterogeneity, such as different diagnostic criteria, study timing, and whether researchers excluded previously depressed patients or not. Most of all, sociocultural differences in the study population may also play a role.

3. Post-stroke emotional incontinence (PSEI) and QOL

Post-stroke emotional incontinence (PSEI) is also a common sequel of stroke (Chen YK et al 2011, Choi-Kwon et al 2012, Choi-Kwon et al 2006a, Kim JS and Choi-Kwon 2000). Along with depression, anger and anxiety, PSEI may be a part of a wider spectrum of emotional disorders that occur secondary to the brain damage associated with neurochemical derangement. Stroke patients often develop emotional disturbances after the brain injury where PSD and PSEI are the most common. Although PSD and PSEI appear to be closely related, they are different entities. We

have reported that they are caused by injuries on different anatomic locations (Kim JS and Choi-Kwon 2000). Also, the related factors for each type of emotional disturbance were different according to the post-stroke stages (Choi-Kwon et al 2012). Lesion locations closely related to PSEI were the basal ganglia/internal capsule and the pons where abundant serotonergic fibers exist. It is suggested that during the acute stage of stroke, the PSD is closely associated with the severity of neurologic dysfunction whereas PSEI is more closely related to neurochemical changes associated with damage to specific brain regions. Our data are in an agreement with a recent PET study in which the brain of patients with post stroke pathologic crying had low baseline serotonin binding potentials (Grajny et al 2016).

We also found that polymorphisms in the serotonin gene, the STIn2 10/10 genotypes, were independently related to PSEI at 3 months post-stroke (Choi-Kwon et al 2017, Ko et al 2018). Our data highlight a relationship between PSEI and serotonin gene polymorphism in stroke survivors. A lack of social support was associated with both PSD and PSEI after 3 months, suggesting that psychosocial-behavioral intervention may reduce emotional disturbances during the subacute stage of stroke. Furthermore, the high prevalence rate of PSEI may also reflect overarching socio-cultural differences in the development of PSEI. Compared to the Western society, Korean stroke patients are typically discharged to their homes and depend on their family members for care instead of being transferred to a healthcare facility. This may indicate that perhaps Korean stroke patients are more prone to PSEI triggered by any conflicts that may rise between family members.

Studies have shown that the PSEI has a significantly adverse effect on QOL (Chen YK et al 2011, Choi-Kwon et al 2008, Choi-Kwon et al 2012). Stroke patients with PSEI showed significantly lower scores that represented health-related QOL. They very often show particularly significant impairment when it comes to mental

health and social functions, which may be related to the uncontrollable episodes of laughing, crying or both, which are characteristics of PSEI. These results emphasize the importance of treating PSEI as early as possible to avoid negative consequences that affect QOL such as social isolation.

4. Post-stroke anger proneness and QOL

Although some recent studies have sporadically reported the incidence of post-stroke anger proneness (PSAP), it has received far less attention than PSEI (Kim JS et al 2002, Kim JS et al 2017). Despite the little attention given, anger or aggressive behavior has been well documented (Aybek et al 2005, Choi-Kwon et al 2006b, Kim JS et al 2002, Lau et al 2017, Mark 2016). Similar to PSEI, we also found high rates of PSAP in Korean population (Kim JS 2017, Kim JS et al 2002). The PSAP was present in 15% of patients at admission. The monoamine oxidase-A (MAO-A) gene polymorphism was also related to PSAP. Low MAO-A activity was the factors related to PSAP. When we compared the patients with and without PSAP, we realized that the presence of depression was the same in the two groups, but the number of patients with emotional incontinence was much higher when PSAP was present. PSAP was found to be related to depression and PSEI, and to have negative effect on QOL. PSAP is highly likely to cause social isolation by influencing family life and social support.

5. Post-stroke fatigue (PSF) and QOL

Fatigue is commonly reported among stroke survivors which has a great impact on patients' QOL (Choi-Kwon et al 2006a, Choi-Kwon and Kim 2011, Choi-Kwon et al 2005, Hinkle et al 2017). Review articles have indicated the incidence of PSF to range from 23% to 77% (Choi-Kwon and Kim 2011, Hinkle et al 2017). With high prevalence rate, PSF exerts a negative impact on several aspects that comprise one's QOL such as ability to participate in physical, social, familial and professional activities. It also plays as an

indicator of decreased health-related QOL. Studies have indicated that patients who have developed PSF further suffered from neurological and physical deficits, sleep disturbances, pain, PSEI that were triggered by PSF (Hinkle et al 2017). It may also interfere with patients' compliance with rehabilitation, pharmacological and non-pharmacological treatment regimens. Although data have shown relationship between PSF and post-stroke QOL, further research is recommended in identifying pathophysiological mechanisms of PSF, preventative measures and its effects of caregivers.

6. Post-stroke sleep disturbances (PSSD) and QOL

Post-stroke sleep disturbances (PSSD) are also a common debilitating factor that threatens stroke survivors' QOL (Park and Choi-Kwon 2018, Suh et al 2014). Although there still is an unclear definition of PSSD, various sleep-related problems are observed among the stroke survivors including sleep apnea, nighttime sleep disturbances (NSDs) and excessive daytime sleepiness (EDS) (Karaca 2016, Park and Choi-Kwon 2018). In our previous study that involved 282 acute post-stroke stage patients has shown that 21% had less than 6 hours of sleep each night and 39% reported EDS (Suh et al 2014). Another study that we conducted to evaluate PSSD at 3 months post-stroke has indicated 44% of stroke survivors to have poor nighttime sleep and 14% to have EDS (Suh et al 2016). The contributing factors of PSSD remain unclear, but they were in strong accordance with presence of PSEI, PSD and PSF, especially for NSDs and EDS (Park and Choi-Kwon 2018).

7. Post-stroke pain (PSP) and QOL

Stroke survivors often leaves PSP triggered by peripheral or central nervous system mechanisms, which debilitates QOL even patients being with any disability or physical impairment (Singer et al 2017, Vukojevic et al 2018). We have previously identified several sensory deficits that patients

described as PSP including numbness, burning sensation, coldness and squeezing sensation (Kim JS and Choi-Kwon 1999). The PSP is directly related to decreased QOL due to its exacerbating nature on physical, psychological and/or social impairment. A recent review article has shown that PSP prevalence ranges widely from 8% to 55% of stroke patients (Singer et al 2017). Depending on the injury location, patient may present with varying types, quality and severity of PSP.

8. The mechanisms for post-stroke emotional dysfunction (PSED)

Although various neurotransmitters such as dopamine and glutamate have been proposed to play a role in the development of PSED, serotonin appears to be the most relevant. The evidence appears in numerous anecdotal reports and also in clinical trials (Kim JM et al 2012, Nahas et al 1998). Serotonin transporter binding ratios in the midbrain and pons were found to be lower in the patients with emotional incontinence compare to those without (Bharathi and Lee 2006, Kim JS et al 2017, Moller et al 2007). We also reported that PSEI is related to serotonin gene polymorphism, 5-HTTLPRs allele and STIn2 VNTR 12/10, 10/10 (Choi-Kwon et al 2012). Polymorphisms in the serotonin gene, the STIn2 10/10 genotypes were found to be significantly related to PSEI development at 3-month post-stroke, which was in accordance with another recent study that investigated serotonin transporter gene polymorphisms in both post-stroke patients and idiopathic major depression patients (Choi-Kwon et al 2012, Lee et al 2018, Myung et al 2010). Also, as previously study has shown that tryptophan hydroxylase (TPH) gene expressions are modulated by stress response, we have found TPH-1 and TPH-2 genes to be related to serotonin synthesis and PSF development (Chen GL and Miller 2013, Choi-Kwon et al 2015).

9. Treatment of PSED using selective serotonin reuptake inhibitor (SSRI) to improve QOL

Fluoxetine, a SSRI is effective in treating several types of PSED such as PSEI and PSAP (Choi-Kwon et al 2008, Choi-Kwon et al 2006b, Mead et al 2013, Mead et al 2012). A recent Cochrane review by Dr. Hackett's group also confirmed that the SSRI is effective in reducing not only the frequency and but also severity of emotional incontinence after stroke (Hackett and Pickles, 2014; Kutlubaev and Hackett, 2014). However, the effects of SSRIs in improving post-stroke QOL are not fully reported. Although a few studies attempted incorporating biobehavioral or rehabilitation therapies for post-stroke QOL improvement in patients with PSEI, pharmacological interventions were rarely attempted. We studied 152 consecutive stroke patients (mean age, 58 years) with PSD, PSEI or PSAP using the Korean version of SF-36 (Choi-Kwon et al 2008). Fluoxetine was effective in improving QOL, particularly so in the mental health subdomain, suggesting that fluoxetine may be used to improve the QOL of stroke patients with emotional dysfunction. In an agreement with a previous study, we found that quality of life was significantly lower in patients with PSD than those with either PSA or PSEI (Chen YK et al 2011, Choi-Kwon et al 2006a, Kim JS et al 2005, Mutai et al 2016, Suenkeler et al 2002, Suh and Choi-Kwon 2010). Although quality of life improved for all patients as time passed, the discrepancy between the PSD patients and the other groups remained the same, suggesting further research in identifying and treating PSD in a timely manner to eventually improve the QOL in stroke survivors.

Nursing research often are not conducted with a wide scope and focus. However, nursing must be seen as a field of study that evolve to have applicability and generalizability to a broader health, systematic and political spectrums. As an example, one may consider the topic

of increasing QOL in specific population and continue to broaden and expand their research interests regarding different aspects related to individual QOL. Nursing researchers must employ various methods to answer intriguing questions to achieve evidence-based practice and an integrated continuum of care services for the public health, medical science and welfare services.

References

- Aybek S, Carota A, Ghika-Schmid F et al (2005). Emotional behavior in acute stroke: the Lausanne emotion in stroke study. *Cogn Behav Neurol* 18(1), 37-44.
- Bharathi V and Lee FS (2006). Emotional incontinence--the other poststroke phenomenon. *Med J Malaysia* 61(4), 490-492.
- Chen GL and Miller GM (2013). Tryptophan hydroxylase-2: an emerging therapeutic target for stress disorders. *Biochem Pharmacol* 85(9), 1227-1233. DOI: 10.1016/j.bcp.2013.02.018
- Chen YK, Wong KS, Mok V et al (2011). Health-related quality of life in patients with poststroke emotional incontinence. *Arch Phys Med Rehabil* 92(10), 1659-1662. DOI: 10.1016/j.apmr.2011.04.016
- Choi-Kwon S, Choi J, Kwon SU et al (2008). Fluoxetine improves the quality of life in patients with poststroke emotional disturbances. *Cerebrovasc Dis* 26(3), 266-271. DOI: 10.1159/000147454
- Choi-Kwon S, Choi JM, Kwon SU et al (2006a). Factors that Affect the Quality of Life at 3 Years Post-Stroke. *J Clin Neurol* 2(1), 34-41. DOI: 10.3988/jcn.2006.2.1.34
- Choi-Kwon S, Han K, Choi Set al (2012). Poststroke depression and emotional incontinence: factors related to acute and subacute stages. *Neurology* 78(15), 1130-1137. DOI: 10.1212/WNL.0b013e31824f8090

- Choi-Kwon S, Han SW, Kwon SU et al (2006b). Fluoxetine treatment in poststroke depression, emotional incontinence, and anger proneness: a double-blind, placebo-controlled study. *Stroke* 37(1), 156-161.
- Choi-Kwon S, Han SW, Kwon SU et al (2005). Poststroke fatigue: characteristics and related factors. *Cerebrovasc Dis* 19(2), 84-90.
- Choi-Kwon S and Kim JS (2011). Poststroke fatigue: an emerging, critical issue in stroke medicine. *Int J Stroke* 6(4), 328-336. DOI: 10.1111/j.1747-4949.2011.00624.x
- Choi-Kwon S, Ko M, Jun SE et al (2017). Post-stroke fatigue may be associated with the promoter region of a monoamine oxidase: A gene polymorphism. *Cerebrovasc Dis* 43(1-2), 54-58. DOI: 10.1159/000450894
- Choi-Kwon S, Mitchell PH and Kim JS (2015). Nursing interventions for poststroke fatigue. *Stroke* 46(10), e224-e227. DOI: 10.1161/STROKEAHA.115.009534
- Grajny K, Pyata H, Spiege K et al (2016). Depression symptoms in chronic left hemisphere stroke are related to dorsolateral prefrontal cortex damage. *J Neuropsychiatry Clin Neurosci* 28(4), 292-298. DOI: 10.1176/appi.neuropsych.16010004
- Hackett ML and Pickles K (2014). Part I: frequency of depression after stroke: an updated systematic review and meta-analysis of observational studies. *Int J Stroke* 9(8), 1017-1025. DOI: 10.1111/ijs.12357
- Hinkle JL, Becker KJ, Kim JS et al (2017). Poststroke fatigue: Emerging evidence and approaches to management: a scientific statement for healthcare professionals from the American Heart Association. *Stroke* 48(7), e159-e170. DOI: 10.1161/STR.000000000000132
- Karaca B (2016). Factors affecting poststroke sleep disorders. *J Stroke Cerebrovasc Dis* 25(3), 727-732. DOI: 10.1016/j.jstrokecerebrovasdis.2015.11.015
- Kim JM, Stewart R, Kang HJ et al (2012). Associations of serotonergic genes with poststroke emotional incontinence. *Int J Geriatr Psychiatry* 27(8), 799-806. DOI: 10.1002/gps.2787
- Kim JS (2017). Management of post-stroke mood and emotional disturbances. *Expert Rev Neurother* 17(12), 1179-1188. DOI: 10.1080/14737175.2017.1395281
- Kim JS and Choi-Kwon S (1999). Sensory sequelae of medullary infarction: differences between lateral and medial medullary syndrome. *Stroke* 30(12), 2697-2703.
- Kim JS and Choi-Kwon S (2000). Poststroke depression and emotional incontinence: correlation with lesion location. *Neurology* 54(9), 1805-1810.
- Kim JS, Choi-Kwon S, Kwon SU et al (2005). Factors affecting the quality of life after ischemic stroke: young versus old patients. *J Clin Neurol* 1(1), 59-68. DOI: 10.3988/jcn.2005.1.1.59
- Kim JS, Choi S, Kwon SU et al (2002). Inability to control anger or aggression after stroke. *Neurology* 58(7), 1106-1108.
- Kim JS, Lee EJ, Chang DI et al (2017). Efficacy of early administration of escitalopram on depressive and emotional symptoms and neurological dysfunction after stroke: a multicentre, double-blind, randomised, placebo-controlled study. *Lancet Psychiatry* 4(1), 33-41. DOI: 10.1016/S2215-0366(16)30417-5
- Ko M, Choi-Kwon S, Jun SE et al (2018). Poststroke emotional disturbances and a tryptophan hydroxylase 2 gene polymorphism. *Brain Behav*, 8(2). e00892. DOI: 10.1002/brb3.892
- Kutlubaev MA and Hackett ML (2014). Part II: predictors of depression after stroke and impact of depression on stroke outcome: an updated systematic review of observational studies. *Int J Stroke* 9(8), 1026-1036. DOI: 10.1111/ijs.12356
- Lau CG, Tang WK, Liu XX et al (2017). Poststroke

agitation and aggression and social quality of life: a case control study. *Top Stroke Rehabil* 24(2), 126-133. DOI: 10.1080/10749357.2016.1212564

Lee EJ, Oh MS, Kim JS et al (2018). Serotonin transporter gene polymorphisms may be associated with poststroke neurological recovery after escitalopram use. *J Neurol Neurosurg Psychiatry* 89(3), 271-276. DOI: 10.1136/jnnp-2017-316882

Mark VW. (2016). Stroke and Behavior. *Neurol Clin* 34(1), 205-234. DOI: 10.1016/j.ncl.2015.08.009

Mead GE, Hsieh CF and Hackett M (2013). Selective serotonin reuptake inhibitors for stroke recovery. *JAMA*, 310(10), 1066-1067. DOI: 10.1001/jama.2013.107828

Mead GE, Hsieh CF, Lee R et al (2012). Selective serotonin reuptake inhibitors (SSRIs) for stroke recovery. *Cochrane Database Syst Rev* 11, CD009286. DOI: 10.1002/14651858.CD009286.pub2

Moller M, Andersen G and Gjedde A (2007). Serotonin 5HT1A receptor availability and pathological crying after stroke. *Acta Neurol Scand* 116(2), 83-90.

Mutai H, Furukawa T, Nakanishi K et al (2016). Longitudinal functional changes, depression, and health-related quality of life among stroke survivors living at home after inpatient rehabilitation. *Psychogeriatrics* 16(3), 185-190. DOI: 10.1111/psyg.12137

Myung W, Lim SW, Kim J et al (2010). Serotonin transporter gene polymorphisms and chronic illness of depression. *J Korean Med Sci* 25(12), 1824-1827. DOI: 10.3346/jkms.2010.25.12.1824

Nahas Z, Arlinghaus KA, Kotrla KJ et al (1998). Rapid response of emotional incontinence to selective serotonin reuptake inhibitors. *J Neuropsychiatry Clin Neurosci* 10(4), 453-455.

Park DI and Choi-Kwon S (2018). Poststroke sleep disorders: an executive summary. *J*

Neurosci Nurs 50(6), 314-317. DOI: 10.1097/JNN.0000000000000404

Singer J, Conigliaro A, Spina E et al (2017). Central poststroke pain: A systematic review. *Int J Stroke* 12(4), 343-355. DOI: 10.1177/1747493017701149

Suenkeler IH, Nowak M, Misselwitz B et al (2002). Timecourse of health-related quality of life as determined 3, 6 and 12 months after stroke. Relationship to neurological deficit, disability and depression. *J Neurol* 249(9), 1160-1167.

Suh M and Choi-Kwon S (2010). Structural equation modeling on quality of life in stroke survivors [Written in Korean.]. *J Korean Acad Nurs* 40(4), 533-541. DOI: 10.4040/jkan.2010.40.4.533

Suh M, Choi-Kwon S and Kim JS (2014). Sleep disturbances after cerebral infarction: role of depression and fatigue. *J Stroke Cerebrovasc Dis* 23(7), 1949-1955. DOI: 10.1016/j.jstrokecerebrovasdis.2014.01.029

Suh M, Choi-Kwon S and Kim JS (2016). Sleep Disturbances at 3 Months after Cerebral Infarction. *Eur Neurol* 75(1-2), 75-81. DOI: 10.1159/000443763

Vukojevic Z, Dominovic Kovacevic A, Peric S et al (2018). Frequency and features of the central poststroke pain. *J Neurol Sci* 391, 100-103. DOI: 10.1016/j.jns.2018.06.004



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