

Original Paper

Effect of Acupressure on Anxiety, Stress, and Depression Among the Primary Family Caregivers of the Patients with Stroke



Najmeh Javan Sangani¹ , Hossein Rahimi² , Seyed Mohammad Mousavi Mirzaei³ , Hamidreza BahramiTaghanaki⁴ , Seyyed Abolfazl Vagharseyyedin⁵

1. Nursing (MSc), Department of Nursing, School of Nursing and Midwifery, Birjand University of Medical Sciences, Birjand, Iran.
2. Nursing (MSc), Instructor, School of Nursing and Midwifery, Neyshabur University of Medical Sciences, Neyshabur, Iran
3. Assistant Professor, Department of Neurology, School of Medicine, Birjand University of Medical Sciences, Birjand, Iran.
4. Associate Professor, Department of Chinese and Complementary Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.
5. Associate Professor, Department of Nursing, School of Nursing and Midwifery, Birjand University of Medical Sciences, Birjand, Iran.



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ABSTRACT

Introduction: Psychological distress is prevalent among the primary family caregivers of patients with stroke.

Objective: This study evaluated the effects of acupressure on anxiety, stress, and depression among the primary family caregivers of Patient With Stroke.

Materials and Methods: In this sham-controlled randomized clinical trial, 96 family caregivers of Patient with Stroke were selected and allocated to the acupressure (n=40) and sham (n=42) groups. The study data were collected using demographic questionnaires for the patients and caregivers, the Barthel index (for assessing independence in daily living activities,) and the Persian version of the Depression Anxiety Stress Scale (DASS). Participants in the acupressure group received training about acupressure on the Yin Tang and HT7 points, while participants in the sham group received training about acupressure on the CV24 and TB5 sham points. The acupressure intervention lasted for 30 consecutive days. Statistical tests, including the Kolmogorov-Smirnov test, the independent t test, the Chi-square test, the Fisher exact test, the Wilcoxon, Mann-Whitney U test, and the analysis of covariance (ANCOVA) were applied to analyze the data.

Results: The mean ages of the participants were 46.1±12.1 years in the acupressure group and 42.7±11.8 years in the sham group. The mean ages of the patients in these groups were 75.1±8.1 and 76.8±9.7 years; respectively. Regarding the demographic characteristics, no significant differences were observed between the acupressure and the sham groups. Regarding the pre-test mean scores of anxieties, stress, and depression, there were no significant differences between the acupressure and the sham groups. Anxiety and stress significantly reduced after the intervention only in the acupressure group (P<0.05). However, depression did not change substantially during the study. The ANCOVA indicated significant

* Corresponding Author:

Seyyed Abolfazl Vagharseyyedin, Associate Professor.

Address: Department of Nursing, School of Nursing and Midwifery, Birjand University of Medical Sciences, Birjand, Iran.

Tel: +98 (915) 3624605

E-mail: Waghars@bums.ac.ir

... differences between the two groups after the intervention regarding anxiety and stress. In other words, in the acupressure group, anxiety and stress significantly improved compared to the sham group ($P < 0.05$).

... **Conclusion:** It seems that the acupressure on the Yin Tang and HT7 points can help manage anxiety and stress among the primary family caregivers of Patient With Stroke.

Highlights

- Most family caregivers of patients with stroke suffer from psychological problems, such as anxiety, stress, and depression.
- Such psychological problems affect patients' well-being and cause caregiver burnout.
- As a simple and safe intervention, acupressure can effectively reduce anxiety and stress among the family caregivers of patients with stroke.

Plain Language Summary

Most family caregivers of patients with stroke suffer from anxiety, stress, and depression. There are medicines, such as benzodiazepines, for managing these psychological problems which have known adverse effects. The severity of the adverse effects of drugs highlights the necessity of managing psychological problems using safer complementary and alternative therapies. There are limited studies about the impact of acupressure on family caregivers. The present study investigated the effects of acupressure on anxiety, stress, and depression among the primary family caregivers of patients with stroke. In this study, the participants in the acupressure group, the Yin Tang and HT7 points, were used for acupressure. However, the CV24 and TB5 sham points were used in the sham group. Participants in the two groups personally performed this intervention in the sitting position for 30 consecutive days. Findings revealed the positive effects of acupressure on the Yin Tang and HT7 points acupressure in reducing anxiety and stress among the family caregivers of patients.

Introduction

Stroke is the third leading cause of death and the second leading cause of disability worldwide [1]. According to a recent report, in 2019, the number of incident cases of stroke across the world was 12.2 million [2]. In a study conducted in 2021, the crude annual incidence rate per 100000 at-risk populations was found to be 145.4 for all types of strokes in Iran [3].

Permanent sequelae of stroke cause problems with daily activities and functions, negatively affecting patients' self-care ability and social participation [4-6]. Patients with stroke (PwS) spend the acute phase of stroke in clinical settings and then are discharged from the hospital and transferred to the home. In Iran, caregiving to these patients in home settings is mainly delivered

through their family caregivers [7, 8]. However, family caregivers may not be ready enough for caregiving, and hence, they may experience severe psychological problems and crises [9]. Factors such as alterations in usual routines, increased burden of responsibilities, and familial dysfunctions can also cause different physical and mental problems for family caregivers [10], including anxiety, stress, and depression. Most family caregivers of PwS suffer from anxiety and depression [11].

Anxiety, stress, and depression among family caregivers affect patients' well-being, cause caregiver burnout, damage patient-caregiver relationships, and increase the risk of verbal or physical violence [12, 13].

There are pharmacological therapies for anxiety, stress, and depression management that have known adverse effects [14, 15]. The multiplicity and severity of

the adverse effects of pharmacological therapies highlight the necessity of managing psychological problems using safer complementary and alternative therapies. Acupressure, an extension of acupuncture, is a non-invasive and low-cost complementary and alternative therapy in which pressure is applied to points located on energy meridians throughout the body. It is supposed that using pressure on certain points in the body (called acupoints) balances physiological and psychological functions [16, 17]. Previous studies have reported the positive effects of acupressure and acupuncture on anxiety, stress, and depression among patients receiving hemodialysis or with knee osteoarthritis [18, 19]. However, there are limited studies into the effects of acupressure or acupuncture on family caregivers. One of the few studies in this area reported that acupuncture significantly reduced stress and depression among the primary family caregivers of elderly people [20]. The results of such studies are not straightforwardly generalizable to the family caregivers of PwS. Therefore, the present study was conducted to evaluate the effects of acupressure on anxiety, stress, and depression among the primary family caregivers of PwS.

Materials and Methods

This sham-controlled randomized clinical trial was conducted in 2019. The study population consisted of all primary family caregivers of PwS with a history of their patients' hospitalization in an educational hospital in Birjand City, Iran, between March 2018 and July 2019. In total, 96 eligible family caregivers were recruited for the study through convenience sampling. The inclusion criteria were as follows: aged 18–60 years, caregiving to a patient with ischemic stroke and a Barthel Index score of less than 60 (this scale measures the extent to which somebody can perform daily living activities independently), definite diagnosis of stroke at least 6 months before the study, basic literacy skills, and no musculoskeletal disorder affecting effective caregiving. The exclusion criteria were as follows: voluntary withdrawal from the study, significant change in caregiving role due to any reason (including patient's death or delegation of responsibility to others), and any significant event affecting psychological status.

Participants were randomly allocated to a sham ($n=48$) and acupressure ($n=48$) group using block randomization with a block size of 4, with a 1:1 allocation ratio.

Based on the findings of a previous study which reported that the pre-test and the post-test Mean \pm SD scores of stresses were 34.47 ± 7.98 and 30.18 ± 5.52 [21], with

80% power and 95% confidence, the minimum sample size was determined to be 40 per group. Considering a possible dropout rate of 20%, the sample size was increased to 48 per group.

A caregiver's demographic questionnaire, a patient's demographic questionnaire, the Barthel index, and the Persian version of the Depression Anxiety Stress Scale (DASS) were used for data collection. The items of the caregiver's demographic questionnaire were caregivers' age, gender, marital status, occupation, educational level, and kinship with the patient. The items of the patient's demographic questionnaire were patients' age, gender, marital status, and educational level.

The Barthel index is a scale for assessing independence in daily living activities. The ten items of this index are toilet use, bowel control, bladder control, feeding, bathing, grooming, dressing, transfers, mobility, and ascending and descending stairs. The possible total score on the scale is 0–100, with higher scores showing greater independence. Scores 0–20, 21–60, 61–90, 91–99, and 100 are interpreted as complete dependence, severe dependence, moderate dependence, mild dependence, and full independence, respectively [22]. A former study on PwS in Iran confirmed the validity and reliability of this scale [23].

The Persian version of DASS has 21 items in three 7-item dimensions. Items are scaled on a 4-point scale from 0 ("Did not apply to me at all") to 3 ("Applied to me very much or most of the time"). The possible total score of each dimension is 0–21, with higher scores showing a more severe problem. This scale has demonstrated satisfactory reliability and validity among the Iranian population [24]. In the present study, the anxiety, stress, and depression dimensions of DASS were used, and their Cronbach alpha values were 0.89, 0.80, and 0.79, respectively.

Participants completed all study instruments before the first session of the intervention and completed the DASS once again one day after the last session of the intervention.

Participants in the acupressure group received acupressure from the study's first author, who had already received necessary acupressure-related training from a Chinese Traditional Medicine specialist affiliated with the Faculty of Traditional Medicine of Mashhad University of Medical Sciences, Mashhad City, Iran. During the intervention, the therapist provided participants in the acupressure and sham groups training about two acu-

points and two sham points and asked them to personally locate the points and exercise acupressure on them. At the end of the training sessions, a CD containing video-based training about the intervention was provided to all participants in both groups.

Training for participants in the acupressure group was about acupressure on the Yin Tang and HT7 points [25]. Participants in this group were asked to start acupressure with mild pressure, progressively increase pressure in 30 seconds until feeling heaviness, numbness, and warmth on the point, continue compression for four minutes, and gradually remove pressure in 30 seconds. Thus, acupressure on each point in each hand lasted 5 minutes. The rest interval between acupressure on each hand was 5 minutes. Accordingly, each acupressure session lasted 15 minutes. They were asked to perform acupressure on the Yin Tang point on both hands in the morning (between 08:00 and 10:00) and the HT7 point on both hands in the evening (between 17:00 and 19:00). These hours were specified merely to ensure that the selected intervention was performed at the same hours of the day in the two groups.

Participants personally performed this intervention in the sitting position for 30 consecutive days. It is noteworthy that participants performed acupressure with a pressure of 2–3 kg using the pulp of their thumb [26]. The amount of applied pressure by the participants was measured using a digital scale several times in the attendance of the first author. Generally, applying 3–4 kg of pressure produces a feeling of tingling and soreness. Participants in the sham group performed the same intervention on the CV24 sham point [27] in the morning and on the TB5 sham point [28] in the evening.

To ensure the daily performance of the intervention, a researcher-made checklist was provided to all participants to document the daily performance of the intervention. Moreover, a private daily message was sent to participants through the auto short message service (SMS) reminder application to remind them of performing the intervention, and made a personal weekly telephone contact on Thursdays to check the accurate performance of the intervention.

In total, 96 primary family caregivers of PwS were recruited for the study. Eight participants were excluded from the acupressure group due to a change in their caregiving role ($n=3$) or voluntary withdrawal ($n=5$), and six participants were excluded from the sham group due to a change in their caregiving role ($n=2$), voluntary withdrawal ($n=3$), or patient's death ($n=1$). Finally, 40

participants in the acupressure group and 42 participants in the sham group completed the study and were included in the final data analysis (Figure 1).

The SPSS software (v. 19.0) was used for data analysis. Normality was tested through the Kolmogorov-Smirnov test, and data were described using the measures of descriptive statistics, namely frequency, percentage, mean, and standard deviation. Between-group comparisons regarding participants' demographic characteristics were made using the independent sample t test, the Chi-square test, and Fisher exact test. As the distribution of the scores of anxieties, stress, and depression was not normal, within-group and between-group comparisons of these scores were made through the Wilcoxon, the Mann-Whitney U tests, and the analysis of covariance (ANCOVA). All analyses were performed at a significance level of less than 0.05.

Results

The mean age of participants was 46.1 ± 12.1 years in the acupressure group and 42.7 ± 11.8 years in the sham group. The mean age of patients in these groups was 75.1 ± 8.1 and 76.8 ± 9.7 years, respectively. The independent t test revealed no significant difference between the two groups regarding the mean ages of participants and patients. Other demographic characteristics of patient and family caregivers are presented in Table 1.

Regarding the pre-test mean anxiety score, statistical analysis did not show a significant difference between the acupressure and the sham groups. In contrast, the post-test mean score of anxiety in the acupressure group was significantly less than the sham group ($P=0.002$). Moreover, while the mean anxiety score in the sham group did not change substantially during the study, it significantly reduced in the acupressure group ($P=0.001$).

Also, there was no significant difference between the acupressure and the sham groups regarding the pre-test mean score of stress, while the post-test mean score of stress in the acupressure group was significantly less than the sham group ($P=0.003$). Moreover, the mean stress score in the sham group did not change significantly during the study, but it significantly reduced in the acupressure group ($P=0.001$).

There was no significant difference between the groups regarding the pre-test and the post-test mean scores of depressions. Also, depression did not significantly change during the study in the two groups (Table 2).

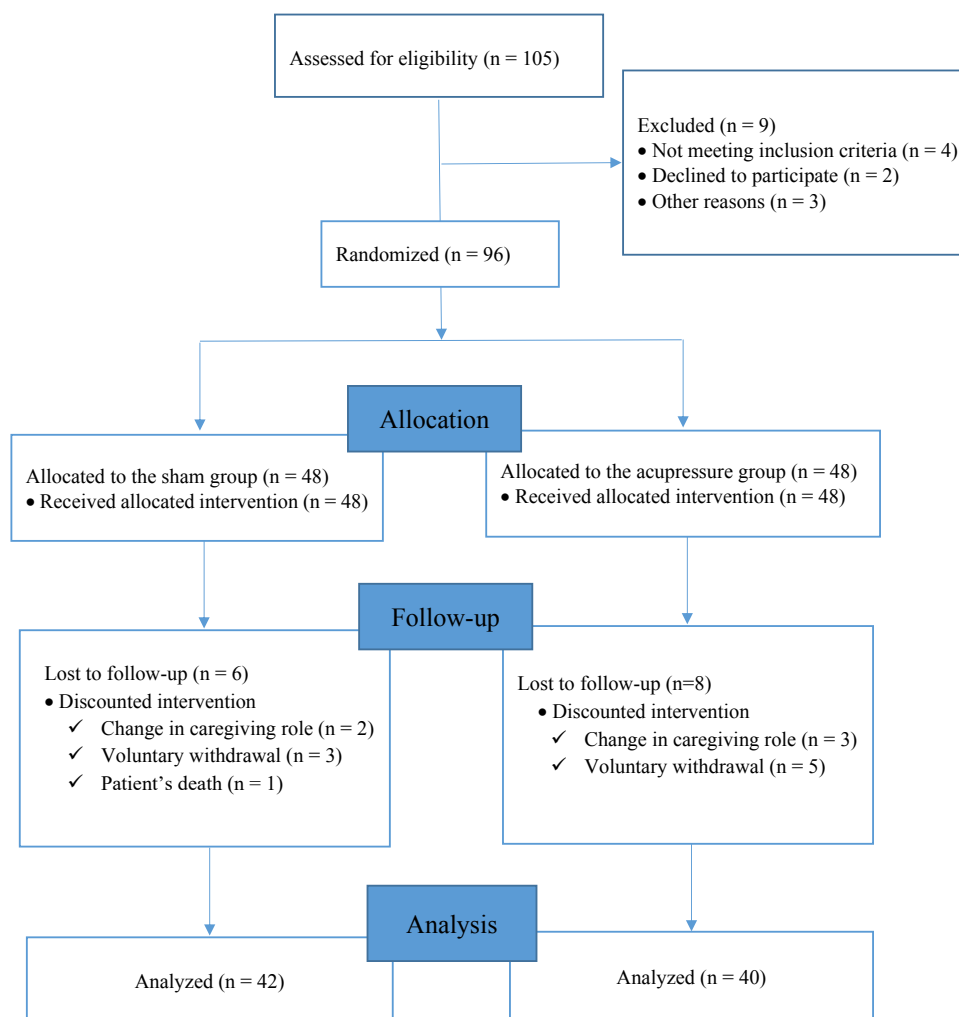


Figure 1. The CONSORT flow diagram of the study

ANCOVA was used to examine the effectiveness of acupressure on anxiety, stress, and depression in the acupressure group while controlling the pre-test scores of these variables in acupressure and sham groups. As presented in Table 3, ANCOVA results indicated significant differences in these variables except for depression between the two groups after the intervention. In the acupressure group, anxiety and stress significantly improved than the sham group ($P < 0.05$). The effect sizes for anxiety and stress were 0.18 and 0.23, respectively.

Discussion

This study evaluated the effects of acupressure on anxiety, stress, and depression among the primary family caregivers of PwS. Findings revealed the significant positive effects of the Yin Tang and HT7 points acupressure on anxiety and stress among the family caregivers of PwS.

Considering the anxiety component, the results of two previous studies showed that applying auricular acupuncture improved anxiety in healthcare providers [29, 30]. From traditional Chinese medicine, the use of HT7 is recommended to relieve the symptoms of anxiety. Neuroscientists believe that the stimulation of the HT7 point stimulates parasympathetic nerves, which in turn can decrease the heart rate and relieve the symptoms of physical anxiety. Finally, functional magnetic resonance imaging (fMRI) and electroencephalogram (EEG) show that HT7 massage modulates the activity of anxiety-related nerve centers in the brain [28, 31].

Regarding results due to stress in the present study, similarly, a former study found that acupressure significantly reduced stress among the family caregivers of elderly people [20]. We could not find more investigations into the effects of acupressure on informal caregivers, such as family caregivers, for comparison. Stress is induced due to imbalances in the autonomic nervous sys-

Table 1. Baseline characteristics in the acupressure group and the sham group

Variables			Acupressure Group	Sham Group	P
			No. (%)		
Caregiver Characteristics	Gender	Female	31(77.5)	30(71.4)	0.52*
		Male	9(22.5)	12(28.5)	
	Marital status	Single	6(15)	4(9.5)	0.44*
		Married	34(85)	38(90.4)	
	Educational level	Below diploma	18(45)	19(45.2)	0.11**
		Diploma	5(12.5)	4(9.5)	
		Associate degree	6(15)	14(33.3)	
		Bachelor’s and higher	11(27.5)	5(11.9)	
	Occupation	Housewife	24(60)	20(47.6)	0.59**
		Self-employed	7(17.5)	7(16.6)	
		Student	3(7.5)	4(9.5)	
		Employee	6(15)	11(26.1)	
	Kinship with patient	Spouse	22(55)	24(57.1)	0.77**
		Child	7(17.5)	9(21.4)	
		Sister	5(12.5)	4(9.5)	
		Brother	2(5)	0(0)	
	Duration of caregiving (m)	Other	4(10)	5(11.9)	0.81**
		6–12	8(20)	9(21.4)	
		13–19	11(27.5)	14(33.3)	
		20–26	9(22.5)	8(19.0)	
		27–33	7(17.5)	9(21.4)	
		34–40	3(7.5)	2(4.7)	
	> 40	2(5)	0(0)		
Patient characteristics	Gender	Female	28(70)	31(73.8)	0.7*
		Male	12(30)	11(26.2)	
	Marital status	Single	15(37.5)	18(42.8)	0.46*
		Married	25(62.5)	24(57.1)	
	Educational level	Below diploma	33(82.5)	35(83.3)	0.71**
		Diploma	4(10)	6(14.3)	
		Associate degree	2(5)	1(2.4)	
		Bachelor’s and higher	1(2.5)	0(0)	
	The Barthel index score	0–15	16(40)	14(33.3)	0.8**
		16–30	7(17.5)	11(26.2)	
		31–45	14(35)	13(30.9)	
		46–60	3(7.5)	4(9.5)	

*The Chi-square test; **The Fisher exact test

Table 2. Between- and within-group comparisons regarding the mean scores of stresses and depression

Outcomes	Group	Time	Mean±SD		P*
			Before the Intervention	After the Intervention	
Anxiety	Sham		6.66±3.08	6.23±2.76	0.12
	Acupressure		5.72±4.46	4.24±3.25	0.001
	p**		0.11	0.002	—
Stress	Sham		10.16±3.36	9.57±2.88	0.08
	Acupressure		10.25±4.14	7.57±3.20	0.001
	p**		0.81	0.003	—
Depression	Sham		7.57±4.07	6.95±3.01	0.6
	Acupressure		7.37±3.7	6.72±3.20	0.3
	p**		0.81	0.76	—

*The Mann-Whitney U test; **The Wilcoxon test

tem secondary to internal and external stimuli. In stressful situations, the amygdala sends a stress signal to the hypothalamus, and then, the hypothalamus activates the sympathetic nervous system, releasing catecholamines such as epinephrine. Moreover, in response to the bodily perception of persistent stimuli as a threat, the hypothalamus activates the hypothalamic-pituitary-adrenal axis, which results in the release of cortisol from the adrenal cortex to make the body ready for response [32, 33]. Acupressure seems to reduce stress by regulating the function of the autonomic nervous system. For instance, the stimulation of the HT7 acupoint increases parasympathetic activity, alleviating stress by lowering heart rate, respiratory rate, and blood pressure and regulating cortisol release [34, 35]. Collectively, the above-mentioned possible mechanisms of applying acupressure on the selected acupoints in this study can partly explain the improvement of the stress in this study.

The present study's findings also showed that acupressure did not significantly reduce depression among the family caregivers of PwS. This finding contradicts a study showed that acupressure significantly reduced depres-

sion among the family caregivers of elderly people [20]. This contradiction is attributable to the differences among different studies regarding the characteristics of samples, the severity of depression, the duration of acupressure, and the type of acupoints used. An explanation for the insignificant effects of our acupressure intervention on depression is the complexity of caregiving to PwS at home, which imposes heavy physical and mental strains on family caregivers. The caregivers of PwS need to compensate for their patients' physical disability through direct help in performing activities of daily living that impose considerable physical strain on them [7]. Moreover, they may encounter new problems during their daily caregiving to their patients regarding the coverage of care-related costs, management of stroke-related complications, and managing the multiple losses they suffer [9]. Therefore, professional healthcare providers must provide these caregivers with educational support, psychological counseling, financial support, and complementary and alternative therapies to reduce their depression.

Table 3. Comparing mean scores of anxieties, stress, and depression after adjustment for baseline scores of the two groups

Variables	Sham Group	Acupressure Group	F	P*
Anxiety	5.92±0.23	4.82±0.23	16.39	0.001
Stress	9.59±0.29	7.54±0.30	23.37	0.001
Depression	6.68±0.37	7.003±0.83	0.35	0.56

*The results of the ANCOVA

This study has some limitations. For instance, participants were family caregivers exclusively recruited from two hospitals. Therefore, further studies are recommended to compare the effects of different acupressure interventions on psychological problems among other groups of informal caregivers of PwS recruited from various healthcare settings. The inclusion of a control group could help strengthen the study. In the current study, participants were recruited during the first months of the COVID-19 pandemic, as explained in the methods section. Consequently, recruiting enough subjects was difficult. Authors, therefore, inevitably adopted a sham-controlled randomized clinical trial, in which the expected placebo effect of acupressure can be controlled.

This study concludes that acupressure effectively reduces anxiety and stress among the family caregivers of patients with ischemic stroke. Therefore, as a simple, inexpensive, and almost safe intervention, acupressure can be used for stress management among these family caregivers.

Ethical Considerations

Compliance with ethical guidelines

The Ethics Committee of Birjand University of Medical Sciences, Birjand, Iran, approved this study (code: IR.BUMS.REC.1398.218). Moreover, the study was registered in the Iranian Registry of Clinical Trials (code: IRCT20190515043601N5). Informed consent was obtained from all participants, and they were free to withdraw from the study. Moreover, they were informed about the study aims, methods, and data confidentiality.

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Authors' contributions

Conceptualization, study design, data analysis, and interpretation: Najmeh Javan Sangani, Hamidreza BahramiTaghanaki, Seyed Mohammad Mousavi Mirzaei, and Seyyed Abolfazl Vagharseyyedin; Sampling and writing the initial draft: Najmeh Javan Sangani, Hossein Rahimi, and Seyyed Abolfazl Vagharseyyedin; Helping to recruit the participants: Seyed Mohammad Mousavi Mirzaei and Hamidreza Bahrami Taghanaki; Review and final approval of manuscript: All authors.

Conflict of interest

The authors declared no conflict of interest.

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References

- [1] Feigin VL, Norrving B, Mensah GA. Global burden of stroke. *Circulation Research*. 2017; 120(3):439-48. [DOI:10.1161/CIRCRESA-HA.116.308413] [PMID]
- [2] GBD 2019 Stroke Collaborators. Global, regional, and national burden of stroke and its risk factors, 1990-2019: A systematic analysis for the Global Burden of Disease Study 2019. *The Lancet Neurology*. 2021; 20(10):795-820. [DOI:10.1016/S1474-4422(21)00252-0] [PMID]
- [3] Aghaali M, Yoosefee S, Hejazi SA, Shuaib A, Rahimi M, Razavina FS, et al. A prospective population-based study of stroke in the Central Region of Iran: The Qom incidence of stroke study. *International Journal of Stroke*. 2022; 17(9):957-963. [DOI:10.1177/17474930211037526] [PMID]
- [4] Tsalta-Mladenov M, Andonova S. Health-related quality of life after ischemic stroke: Impact of sociodemographic and clinical factors. *Neurological Research*. 2021; 43(7):553-561. [DOI:10.1080/01616412.2021.1893563] [PMID]
- [5] Zhou X, Du M, Weng Y, Zhou L. Hard return: The development and transformation process of social participation in stroke survivors; A qualitative study and initial theory. *Clinical Rehabilitation*. 2020; 34(6):824-36. [DOI:10.1177/0269215520917191] [PMID]
- [6] Khazaal W, Taliani M, Boutros C, Abou-Abbas L, Hosseini H, Salameh P, et al. Psychological complications at 3 months following stroke: Prevalence and correlates among stroke survivors in Lebanon. *Frontiers in Psychology*. 2021; 12:663267. [DOI:10.3389/fpsyg.2021.663267] [PMID] [PMCID]
- [7] Hesamzadeh A, Dalvandi A, Bagher Maddah S, Fallahi Khoshknab M, Ahmadi F, Mosavi Arfa N. Family caregivers' experience of activities of daily living handling in older adult with stroke: A qualitative research in the Iranian context. *Scandinavian Journal of Caring Sciences*. 2017; 31(3):515-26. [DOI:10.1111/scs.12365] [PMID]
- [8] Farahani MA, Bahloli S, JamshidiOrak R, Ghaffari F. Investigating the needs of family caregivers of older stroke patients: A longitudinal study in Iran. *BMC Geriatrics*. 2020; 20(1):313. [DOI:10.1186/s12877-020-01670-0] [PMID] [PMCID]
- [9] Lutz BJ, Ellen Young M, Cox KJ, Martz C, Rae Creasy K. The crisis of stroke: Experiences of patients and their family caregivers. *Topics in Stroke Rehabilitation*. 2011; 18(6):786-97. [DOI:10.1310/tsr1806-786] [PMID] [PMCID]
- [10] Kes D, Aydin Yildirim T. The relationship of religious coping strategies and family harmony with caregiver burden for family members of patients with stroke. *Brain Injury*. 2020; 34(11):1461-6. [DOI:10.1080/02699052.2020.1810317] [PMID]

- [11] Zhao J, Zeng Z, Yu J, Xu J, Chen P, Chen Y, et al. Effect of main family caregiver's anxiety and depression on mortality of patients with moderate-severe stroke. *Scientific Reports*. 2021; 11(1):2747. [DOI:10.1038/s41598-021-81596-8] [PMID] [PMCID]
- [12] Gérain P, Zech E. Informal caregiver burnout? Development of a theoretical framework to understand the impact of caregiving. *Frontiers in Psychology*. 2019; 10:1748. [DOI:10.3389/fpsyg.2019.01748] [PMID] [PMCID]
- [13] Johannesen M, LoGiudice D. Elder abuse: A systematic review of risk factors in community-dwelling elders. *Age and Ageing*. 2013; 42(3):292-8. [DOI:10.1093/ageing/afs195] [PMID]
- [14] Ribeiro PRDS, Schlindwein AD. Benzodiazepine deprescription strategies in chronic users: A systematic review. *Family Practice*. 2021; 38(5):684-93. [DOI:10.1093/fampra/cmab017] [PMID]
- [15] Xu XM, Liu Y, Dong MX, Zou DZ, Wei YD. Tricyclic antidepressants for preventing migraine in adults. *Medicine*. 2017; 96(22):e6989. [DOI:10.1097/MD.0000000000006989] [PMID] [PMCID]
- [16] Liang Y, Lenon GB, Yang AWH. Self-administered acupressure for allergic rhinitis: Study protocol for a randomized, single-blind, non-specific controlled, parallel trial. *Trials*. 2019; 20(1):382. [DOI:10.1186/s13063-019-3495-0] [PMID] [PMCID]
- [17] Monson E, Arney D, Benham B, Bird R, Elias E, Linden K, et al. Beyond pills: Acupressure impact on self-rated pain and anxiety scores. *The Journal of Alternative and Complementary Medicine*. 2019; 25(5):517-21. [DOI:10.1089/acm.2018.0422] [PMID] [PMCID]
- [18] Hmwe NTT, Subramanian P, Tan LP, Chong WK. The effects of acupressure on depression, anxiety and stress in patients with hemodialysis: A randomized controlled trial. *International Journal of Nursing Studies*. 2015; 52(2):509-18. [DOI:10.1016/j.ijnurstu.2014.11.002] [PMID]
- [19] Rani M, Sharma L, Advani U, Kumar S. Acupressure as an adjunct to pharmacological treatment for depression, anxiety, and stress in patients with knee osteoarthritis. *Journal of Acupuncture and Meridian Studies*. 2020; 13(4):129-35. [DOI:10.1016/j.jams.2020.07.001] [PMID]
- [20] Cheung DST, Tiwari A, Yeung WF, Yu DSF, So MKP, Chau PH, et al. Self-administered acupressure for caregivers of older family members: A randomized controlled trial. *Journal of the American Geriatrics Society*. 2020; 68(6):1193-201. [DOI:10.1111/jgs.16357] [PMID]
- [21] Goudarzian M, Fallahi-Khoshknab M, Dalvandi A, Delbari A, Biglarian A. Effect of telenursing on levels of depression and anxiety in caregivers of patients with stroke: A randomized clinical trial. *Iranian Journal of Nursing and Midwifery Research*. 2018; 23(4):248-52. [DOI:10.4103/ijnmr.IJNMR_242_16] [PMID] [PMCID]
- [22] Shah S, Vanclay F, Cooper B. Improving the sensitivity of the Barthel Index for stroke rehabilitation. *Journal of Clinical Epidemiology*. 1989; 42(8):703-9. [DOI:10.1016/0895-4356(89)90065-6] [PMID]
- [23] Oveisgharan S, Shirani S, Ghorbani A, Soltanzade A, Baghaei A, Hosseini S, et al. Barthel index in a Middle-East country: Translation, validity and reliability. *Cerebrovascular Diseases*. 2006; 22(5-6):350-4. [DOI:10.1159/000094850] [PMID]
- [24] Asghari A, Saed F, Dibajnia P. [Psychometric properties of the Depression Anxiety Stress Scales-21 (DASS-21) in a non-clinical Iranian sample (Persian)]. *International Journal of Psychology*. 2008; 2(2):82-102. [Link]
- [25] Siegel E. The acupuncture point functions charts and workbook. London: Jessica Kingsley Publisher; 2019. [Link]
- [26] Batvani M, Yousefi H, Valiani M, Shahabi J, Mardanparvar H. The effect of acupressure on physiological parameters of myocardial infarction patients: A randomized clinical trial. *Iranian Journal of Nursing and Midwifery Research*. 2018; 23(2):143-8. [DOI: 10.4103/ijnmr.IJNMR_83_16]
- [27] Omura Y. Acupuncture medicine: Its historical and clinical background. United States: Courier Corporation; 2003. [Link]
- [28] WHO. WHO standard acupuncture point locations in the western pacific region. Geneva: World Health Organization; 2008. [Link]
- [29] Reilly PM, Buchanan TM, Vafides C, Breakey S, Dykes P. Auricular acupuncture to relieve health care workers' stress and anxiety: Impact on caring. *Dimensions of Critical Care Nursing*. 2014; 33(3):151-9. [DOI:10.1097/DCC.000000000000039] [PMID]
- [30] Olshan-Perlmutter M, Carter K, Marx J. Auricular acupressure reduces anxiety and burnout in behavioral healthcare. *Applied Nursing Research*. 2019; 49:57-63. [DOI:10.1016/j.apnr.2019.05.011] [PMID]
- [31] Lee GE, Yun JM, Yang SB, Kang Y, Kang HW, Choi KH, et al. Deqi induction by HT7 acupuncture alters theta and alpha band coherence in human healthy subjects. *Evidence-Based Complementary and Alternative Medicine*. 2017; 2017:7107136. [DOI:10.1155/2017/7107136] [PMID] [PMCID]
- [32] Hakamata Y, Komi S, Moriguchi Y, Izawa S, Motomura Y, Sato E, et al. Amygdala-centred functional connectivity affects daily cortisol concentrations: A putative link with anxiety. *Scientific Reports*. 2017; 7(1):8313. [DOI:10.1038/s41598-017-08918-7] [PMID] [PMCID]
- [33] Do Yup Lee EK, Choi MH. Technical and clinical aspects of cortisol as a biochemical marker of chronic stress. *BMB Reports*. 2015; 48(4):209-16. [DOI:10.5483/BMBRep.2015.48.4.275] [PMID] [PMCID]
- [34] Gordan R, Gwathmey JK, Xie LH. Autonomic and endocrine control of cardiovascular function. *World Journal of Cardiology*. 2015; 7(4):204-14. [DOI:10.4330/wjc.v7.i4.204] [PMID] [PMCID]
- [35] Pellissier S, Dantzer C, Mondillon L, Trocme C, Gauchez AS, Ducros V, et al. Relationship between vagal tone, cortisol, TNF-alpha, epinephrine and negative affects in Crohn's disease and irritable bowel syndrome. *PloS One*. 2014; 9(9):e105328. [DOI:10.1371/journal.pone.0105328] [PMID] [PMCID]