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The effects of head and face massage on delirium among elderly women hospitalized in coronary care units

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ABSTRACT

Aims: There are few studies in the area of managing delirium by using complementary therapies. The aim of this study was "to investigate the effects of face and head massage on delirium among elderly women hospitalized in coronary care units".

Methods: This was a clinical trial study. Eighty eight elderly women with delirium were randomly allocated to either the control or the experimental groups. Women in the experimental group received fifteen-minute face and head massage therapy. Study data were collected and analyzed by using the NEECHAM confusion scale and the $SPSS_{18}$, respectively.

Results: Before the study intervention, the means of total delirium score in the experimental and the control groups were 8.8 and 9.5, respectively. There was no significant difference between the study groups regarding the pretest total delirium score. However, after the study intervention, the mean total delirium score in the experimental group was significantly higher than that of the control group (17.6 vs. 16.7; p=0.03).

Conclusions: Face and head massage therapy can reduce delirium severity; therefore, using it in adjacent to pharmacological interventions is recommended.

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1. Introduction

Delirium is a common problem particularly among patients hospitalized in critical care units. It is a short-term, mild-to-severe altered consciousness and cognition which can last for hours to days [5]. It can happen in three forms including hyperactive, hypoactive, and alternative combined delirium [2].

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The causes of delirium can be infections, drug overdose or withdrawal, acute metabolic disorders, traumas, central nervous system problems, hypoxia, hypo vitaminosis, endocrinologic problems, acute vascular disorders, poisoning, medications, and heavy metals [3 and 4]. Cardiac patients can also develop delirium secondary to arrhythmias, myocardial infarction, heart failure [5], angiography [6], and coronary artery surgeries [7]. Delirium is particularly common among elderly people [8] and hospitalized patients and

it can increase the rates of mortality and hospital-acquired complications [9].

The prevalence of delirium among patients hospitalized in critical care units in different countries is varied and ranges from 11%–89% [10]. In our country, Iran, only handful studies have been conducted so far on delirium. The prevalence of delirium in critical care units located in Iran has been reported to be 44.5%–47% [11]. Annually, delirium affects more than 2.3 million hospitalized elderly people worldwide and incurs healthcare costs of more than four billion dollars. Moreover, it increases the likelihood of re-hospitalization and the costs related to rehabilitation and home care [12]. The three-month mortality rate among patients with an acute delirium attack has been reported to be 23%–33% which can increase to 50%. The mortality rates among hospitalized patients and elderly people who develop delirium are 20%–75% and 22%–76%, respectively. First- and six-month mortality rates of delirium after hospital discharge are 15% and 25%, respectively [14].

Delirium is transient and reversible provided that the underlying cause is treated [14]. Accordingly, delirium management is of paramount importance. Besides managing the underlying cause and starting medication therapy, delirium management also includes physical, environmental, and sensory support as well as complementary therapies. Medications which are used for treating delirium are chlorpromazine, diphenhydramine, haloperidol, olanzapine, perphenazine, quetiapine, and risperidone [15]. Besides, medications, complementary therapies are also used for managing different health problems. Complementary therapies include relaxation exercises, aromatherapy, acupressure, physical activity, music therapy, reflexology, herbal medicine, mind-body techniques, hypnosis, touch therapy, and massage [16].

One of the complementary techniques is massage therapy which has been used for alleviating and managing ailments since remote past [17]. The aim of massage therapy is to enhance the effectiveness of therapeutic interventions through affecting different body organs and systems [18]. Massage is a generic name and includes a wide range of touch therapy techniques such as compression, friction, and movements [19–20]. Despite the old history of using massage for maintaining and promoting health, it was only since 1930s that its effects were assessed and proved in animal experiments and human studies [21].

Currently, there are more than 80 types of massage techniques from which, effleurage and compression are particularly relaxing, simple, and light and hence, all patients including patients with delirium can easily tolerate them [22]. These two types of massage techniques are parts of the Brown's massage therapy [23]. Effleurage includes light, gentle, and rhythmic massaging movements in the direction of blood flow towards the heart [24].

When using the effleurage technique, an increasing pressure is applied by using the whole plantar surface of the hand and the fingers [24]. The positive effects of effleurage include improved blood flow to the massaged area, nerve stimulation, decreased muscular tension, relaxation of muscular fibers, and skin clearance [25]. Effleurage is associated with no pain or discomfort and can be easily applied by amateur individuals even on points where massaging is contraindicated [26]. On the other hand, compression massaging technique includes applying rhythmic pressures on the muscles which causes deep tissue hyperemia and relaxation. This technique is mainly used at the beginning of a massage therapy session in order to warm and prepare muscles for subsequent specialized massages [24].

Studies conducted in the last decades have demonstrated the positive effects of massage therapy on problems such as sinusitis [27], back pain [28], menopausal problems [29], musculoskeletal pains [30], anxiety [31], and sleep quality [32].

Massage can also be applied on the face and the head. Face massage became prevalent since the early 20th century [18]. Face and head massage

is particularly easy and satisfying because patient's body is not to be exposed and it can be applied even in public places such as hospital ward while the intended patients lies on bed in supine position. Patients with delirium are restless and irritable and hence, exposing their body can hinder their recovery. The head and the face are normally exposed and no more exposure is needed for applying massaging techniques. Moreover, face and head massage is among the most effective techniques for fast access to relaxation and rapid reduction of mental and physical fatigue [33]. It can relax facial and ocular muscles, alleviate tension headaches, enhance concentration, reduce fatigue, relieve nervous tensions and stress, improve mood, enhance blood flow, and stimulate the nerves [39].

Given the positive effects of face and head massage and the negative effects of delirium on individuals' physical and social functionality [16], investigating the effects of delirium on the outcomes of patients with delirium looks useful. Moreover, delirium has been showed to be correlated with pain, anxiety, and sleep problems [40]. On the other hand, massage therapy is useful in alleviating pain and anxiety and promoting sleep [34 and 35]. However, to the best of our knowledge, there are few studies in the area of managing delirium by using complementary therapies. The aim of this study was to investigate the effects of face and head massage on delirium among elderly women hospitalized in coronary care units (CCU).

2. Methods

This was a clinical trial study. The study population comprised all elderly women hospitalized in CCUs of Kashani, Al-Zahra, and Chamran teaching hospitals, Isfahan, Iran. Patients were considered eligible if they were female, had an age of 60 years or older, were hospitalized in coronary care units, had received a diagnosis of delirium, were not dependent on drug or alcohol, were not receiving mechanical ventilation at the time of the study, and also if they did not have any visual or hearing problem, history of cognitive or psychiatric disorders, history of receiving psycho-affective drugs, and skin lesions or tender area in the face and the head.

The following sample size calculation formula showed that a sample 88 patients is necessary for the study, n=(z1+z2)2□(2s2)/d2. Sampling was conducted over a four-month period. Patients were ascribed with numbers 1–88 while those receiving odd and even numbers were allocated to the experimental and the control groups, respectively.

A demographic questionnaire and the NEECHAM confusion scale were used for data collection. The items of the demographic questionnaire encompassed age, the underlying condition, and the length of hospital stay. Demographic data were collected through referring to patients' medical records and asking their family members.

The NEECHAM scale consisted of three main subscales including processing (with the three items of attention, command obedience, and orientation), behaviors (with the three items of appearance, motor, and verbal behavior), and physiological parameters (with the three items of vital functions stability, oxygen saturation stability, and urinary continence control). The total scores of these three subscales are respectively 0–14, 0–10, and 0–6, yielding a total NEECHAM score of 0–30. Scores of 27–30, 25–26, 20–24, and 0–19 are interpreted as healthy condition, mild confusion without delirium, mild delirium, and moderate to severe delirium, respectively.

The required time for completing the NEECHAM scale is 8–10 minutes. This scale has been developed based on nurses' 24-hour care-related activities and observations [36]. The NEECHAM confusion scale is a reliable scale for delirium assessment by nurses in general hospital wards and has been recently used for assessing delirium among non-intubated patients hospitalized in critical care units [37].

Sohrabi et al. (2010) reported a Cronbach's alpha, a sensitivity, and a specificity of

respectively 0.96, 87%, and 95% for the scale [38].

Both the demographic questionnaire and the NEECHAM confusion scale were completed for eligible patients at the time of their admission to CCU. Once the NEECHAM scale was completed and a diagnosis of delirium was established, patients in the control and the experimental groups received a single dose of haloperidol prescribed by attending physicians. If patients needed re-administration of haloperidol during the study intervention, they were excluded from the study.

Then, we provided massage therapy to the patients in the experimental group while the patients in the control group solely received routine delirium management therapies.

The massage therapy intervention consisted of thirteen combined techniques selected from the Brown's massage therapy approach (23).

These techniques were developed by combining the compression and the effleurage techniques. Massage therapy was administered by a trained person twice a day (10:00 and 18:00) in two subsequent days—four sessions in total. The face and head massage therapy which was used in the current study had been developed and tested by Bahraini (2014) on 35 women suffering from sinusitis headache [27].

For administrating massage therapy, the intended patient was positioned in supine position and the massage therapist stood at the head of patient's bed. Each movement was repeated five times. Massage therapy sessions lasted for fifteen minutes.

At the end of the fourth massage therapy session, another trained person assessed delirium severity by using the NEECHAM scale. Finally, the severity of delirium in the two groups and across the two measurement time-points were compared by conducting the independent- and the paired samples t as well as the analysis of covariance (ANCOVA) tests. Data analysis was performed via $SPSS_{18}$

3. Results

The prevalence of diabetes mellitus, hypertension, and thyroid disorders among patients in the experimental group was 65.9%, 72.72%, and 6.81%, respectively while these values in the control group were respectively 54.54%, 72.72%, and 25%. The means of participants' age in the experimental and the control groups were 77.06 and 71.16 years while the means of hospital stay in these two groups were 4.11 and 4.6 days, respectively .

The paired-samples t test showed that after the intervention, the mean of total delirium score as well as the mean scores of the processing, behaviour, and physiological control subscales in both the experimental and the control groups increased significantly ($p \leq 0.01$; Table 1). On the other hand, the independent-samples t test revealed that before the intervention, there was no significant difference between the study groups regarding the total delirium score and the scores of the NEECHAM subscales ($p > 0.05$; Table 2).

The means of post-test total delirium score in the control and the experimental groups were 16.7±8.5 and 17.6±8.9, respectively (Table 2). The results of the ANCOVA test with the adjustment of the minor non-significant difference between the study groups regarding the pre-test readings of the total delirium scale indicated that after the intervention, the total delirium mean score and the mean score of the processing subscale in the experimental group were significantly higher than the control group ($p < 0.05$) . However, the difference between the study groups regarding the post-test mean scores of the behaviour and the physiological control subscales was not statistically significant ($p > 0.05$; Table 3).

Before the study intervention, the total NEECHAM score of all patients was less than 24. However, after the study intervention, 15.9%, 15.9%, 22.7%, and 45.5% of patients in the experimental group acquired a total NEECHAM score of respectively 27–30, 25–26, 20–24, and 0–19. In the control group, these values were 9.1%, 9.1%, 31.8%, and 50%,

respectively (Table 4).

4. Discussion

The findings of this study showed the positive effects of massage therapy on delirium. We could not retrieve any study in the area of massage therapy and delirium. However, studies have shown the effectiveness of massage in improving patients' functions [39]. Human skin is the largest observable sensory organ and hence, it plays a significant role in establishing interpersonal communications [39]. The results of a study conducted in Miami University also showed that short-term fifteen-minute massage therapy alleviates anxiety and promotes career output so much so that after massage therapy, workers were more alert and solved mathematical problems faster and with more precision [41].

Given the proximity of the scalp with the

Table 1: Within-groups comparison of the total NEECHAM and its subscales scores

Groups	Variables	Before intervention		After intervention		Paired-samples t	
		Mean	SD	Mean	SD	T	p-value
Experimental	Total delirium score	8.80	4.20	17.6	8.9	9.79	< 0.001
	Processing subscale	3.3	1.9	7.6	4.6	8.51	< 0.001
	Behavior subscale	2.3	1.4	6	2.9	8.97	< 0.001
	Physiological control subscale	3.3	1.8	4	1.9	3.56	0.001
Control	Total delirium score	9.5	4.4	16.7	8.5	8.67	< 0.001
	Processing subscale	3.5	1.9	6.7	4.2	7.21	< 0.001
	Behavior subscale	2.5	1.4	6.1	3	8.72	< 0.001
	Physiological control subscale	3.5	1.8	3.9	1.9	2.67	0.01

Table 2: Between-groups comparison of the total NEECHAM and its subscales scores before the intervention

Variables	Experimental group		Control group		Independent-samples t	
	Mean	SD	Mean	SD	t	p-value
Total delirium score	8.80	4.20	9.5	4.4	0.73	0.46
Processing subscale	8.80	4.20	3.5	1.9	0.44	0.66
Behavior subscale	3.3	1.9	2.5	1.4	0.89	0.37
Physiological control subscale	2.3	1.4	3.5	1.8	0.52	0.6

Table 3: Between-groups comparison of the total NEECHAM and its subscales scores after the intervention

Variables	Experimental group		Control group		Analysis of covariance	
	Mean	SD	Mean	SD	t	p-value
Total delirium score	17.6	8.9	16.7	8.5	3.52	0.03
Processing subscale	7.6	4.6	6.7	4.2	4.11	0.02
Behavior subscale	6	2.9	6.1	3	0.028	0.87
Physiological control subscale	4	1.9	3.9	1.9	0.82	0.37

Table 4: The frequency distribution of post-intervention delirium severity in both study groups

Delirium severity	Experimental group		Control group	
	N	5	N	%
27–30 (no delirium)	7	15.9	4	9.1
25–26 mild confusion	7	15.9	4	9.1
20–24 (mild delirium)	10	22.7	14	31.8
0–19 (moderate to severe delirium)	20	45.5	22	50
Total	44	100	44	100

forehead, temple, and occiput, fatigue of the scalp muscles can deteriorate blood flow to the adjacent areas and cause vague and even migraine headaches [42]. Consequently, head massage is among the most effective strategies for reducing mental and physical fatigue and regaining calm. It is particularly useful for managing stress-related problems. It even can boost physical energy and reduce fatigue in other body organs to some extent [43]. Among the other benefits of face and head massage are relaxation of facial and ocular muscles, alleviation of tension headaches, facial pains, and toothache, improvement of concentration, reduction of mental fatigue, nervous distress, and stressors, and prevention of hearing problems [42]. Gentle massage helps patients articulate their feelings more conveniently, gives positive feelings to patients who suffer from physical and psychosocial pains, and facilitates the process of communicating with them [44 and 45]. On the other hand, exposing patient's body, which can aggravate delirium, is not necessary for applying face and head massage.

Bahraini (2014) investigated the effect of face and head massage therapy on sinusitis headaches among 35 female students in Isfahan, Iran, and reported that effleurage and compression massage therapy techniques significantly decreased headache severity [27]. Dorsare et al. (2012), Preyde (2000), Hosseinabadi et al. (2008), and Shafiei et al. (2014) also conducted studies on respectively 60 post-menopausal women [29], 107 patients with chronic back pain [46], 30 elderly people [47], and 72 patients undergoing coronary artery bypass graft surgery [48] and reported that massage therapy has positive effects on somatic menopausal symptoms, sleep quality, and physical pain. The results of a meta-analysis conducted by Jane et al. (2011) also showed that massage therapy is an appropriate complementary therapy for alleviating chronic non-malignant pains [49]. Other studies also have reported the positive effects of massage therapy on emotions, anxiety, mental stress, body image[50], self-confidence [51], thoughts [52], mood [52], sleep pattern and quality [49], stress hormones [51], sinusitis headaches [27], and blood pressure, heart rate [54]., and respiratory rate [55]. Consequently, given the direct correlation of delirium and massage therapy with anxiety, emotions, stress, pain, sleep disorders, vital signs, and physiological parameters, massage therapy can be potentially effective in alleviating delirium. Moreover, it seems that face and head massage can warm the tissues in these areas and increase cerebral blood flow and hence, promote the function of the brain. Further studies are needed for verifying the accuracy of this theory.

Delirium is highly prevalent among elderly people and causes them different physical, mental, and psychosocial problems. On the other hand, it is refractory to medication therapy and increases healthcare costs. Therefore, conducting further studies for assessing the effects of complementary therapies (including massaging) on patients with delirium seems pretty crucial. Moreover, given the scarcity of studies on the effects of complementary therapies on delirium, robust large-scale studies are needed for providing conclusive evidence regarding the effectiveness of these therapies in alleviating delirium.

5. Conclusions

Face and head massage is a safe, simple, cost-effective, and well-tolerated non-pharmacological therapy for managing delirium. Accordingly, using it in adjacent to pharmacological interventions is recommended for delirium management. Nurses can both use it personally or educate patients' family members to use it for alleviating the manifestations of delirium.

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