IMPACT OF REFLEXOLOGY ON MECHANICAL NECK PAIN IN POST-MENOPAUSAL OFFICE WORKERS

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Abstract

Background: Reflexology is a popular non–invasive alternative therapy. It's a safe method and doesn't require special equipment. It has been proved that reflexology influences many health conditions and musculoskeletal pain. However, no research has cleared the effect of reflexology on chronic mechanical neck pain (CMNP), which is recorded as the commonest complaint in office workers. Objective: The study was an attempt to measure the influence of reflexology technique on CMNP, range of motion and neck muscle strength in middle aged office worker females.

Method: Thirty post-menopausal subjects with age ranged from 50-60 years suffering from mechanical neck pain for more than 3 months were assigned randomly into two groups, experimental group received 20 minutes reflexology sessions twice a week for 4 weeks, and the other group underwent self-stretches in-between their work time (control). Assessment for pain by visual analogue scale (VAS), range of motion (ROM), muscle strength by manual muscle test (MMT) and disability index was done before and after the treatment for both groups.

Results: According to results there were significant improvements in ROM and muscle strength and a reduction in pain and disability index in the study group, while there were significant differences in some parameters of the control group.

Conclusion: It was concluded that reflexology is an effective, safe and non-invasive complementary treatment for chronic mechanical neck pain.

Keywords: Reflexology, chronic mechanical neck pain, post-menopausal office workers

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Introduction

Menopause has a significant impact on women's life cycle, it is a long-lasting miss of menstrual cycle due to loss of ovaries functions. Menopause, affects all women worldwide, considered as normal biological changes occurring at an average age of 51. In fact, physical, mental, psychological and physiological alterations take place with menopause. All these changes are mostly due to the reduction of estrogenic and other hormones (Aydın, & Yiğitalp, 2021).

Post-menopausal period follows menopause. Any female to be considered in the postmenopausal period, menstruation must have been missed for at least twelve months to start menopause naturally. On the other hand, in pathological conditions; three months following abdominal hysterectomy and bilateral oophorectomy in case of starting menopause surgically. The postmenopausal period is considered when physiological, psychological and social alterations are observed. In comparison to males, females have a smaller shape and extra fat tissue; in addition to a lowered muscular strength because of reduced muscular growth as well as a weaker muscular fibres. With aging, females' basal metabolic rate, with other physical alterations, starts to decline dramatically. A sharp decrease of physical strength lead to a reduced muscular mass due to absence of exercises. In females, the occurrence of musculoskeletal signs and symptoms in the upper limbs, for example, the wrists, shoulders, and fingers is higher than that in males (Park, et al., 2021).

Nowadays, people do not have the time to go to medical centres to treat their mild or moderate pain, especially chronic pain, as they got used to treat pain with pain killers. Moreover, they become more afraid of the drugs side effects. As a result, people now are interested in alternative medicine as a replacement of time & money consuming doctors' visits.

Reflexology is a popular non–invasive alternative therapy. It has increasingly become more common within a variety of health care sittings for patients with hospice sittings (Barraclough, J. (Ed.)., 2007). It is a stimulating method that can be performed by the therapists or the patients themselves. It is a safe method and does not require special equipment, can be done anywhere, anytime and at any age. It is different from general foot massage, the technique is performed by applying pressure on some points in the foot or hands called "reflex zones" that stimulates the body's own healing power and the body reflex to the pressure by generating reflex effect on corresponding organ, muscle, gland as well as nerve. William Fitzgerald found the pressure on specific points in the throat, neck and nose actually relived pain and morning sickness from other causes (Fitzgerald, W. H., & Bowers, E. F., 1917).

There have been theories for the description of the mechanism of reflexology. Some researchers suggested that via pressing these points it equalizes energy disparities that caused disorder (Tiran, D., & Chummun, H., 2005). Other theories suggested that there will be stimulation by applying reflexology, improves blood circulation, a sense of relaxation and maintain homeostasis (Chandrasekar, S., et al., 2019). Another theory claimed that it has an effect on the dispersal of calcium or uric acid crystals and it assists the body to normalize metabolism (Greasley, P., 2010). It has been proved that reflexology has an effect on stress reduction, some cardiovascular conditions such as: hypertension, hypotension, heart problems (Frishman, W. H., et al., 2005), and different types of musculoskeletal pain, rehabilitation and support of wound healing (Xavier, R. 2007). However, reflexology does not treat diseases, but it does bring a change in the body that enables it to heal itself (Jones S. 2009).

Mechanical Neck Pain (MNP): It is one of the foremost debility reasons in the world; it affects about 70% of individuals at some point in their lives (Motonaga, T., et al., 2005). MNP is known as widespread neck pain with or without shoulder pain with mechanical features as: symptoms created by constant positions, movements or by palpation of cervical muscles (Fernandez-de-Las-Penas, C., et al., 2007). The main sign is pain in the cervical area frequently sharing limited range of movement and limited function (Ganesh, G. S., et al., 2015). The researches devoted to treat neck pain are relatively low in comparison to other leading causes of disability (Steven P. Cohen M., 2015). Risk factors for neck pain are include the psychological state of the patient i.e.; poor social support (Paksaichol, A., et al., 2012), high job demands and low job control (Macfarlane, G. J., et al., 2009), in addition to physical factors including static posture at work, repetitive neck movements (neck flexion) and prolonged sitting at work (Ayanniyi, O., et al., 2010).

Age changes in women and pain: Neck pain is a significant problem, especially in workers (Côté, P., et al., 2010). Evidence suggests that being a woman, white and middle aged, increased the risk of neck pain being chronic (Goode, A. P., et al., 2010). Generally, neck pain proportion in females is greater than males (De Koning CHP vdHS, et al., 2008), increasing from the age of 35 to 49 (Protani M DR, et al., 2010). Females have lower pain threshold and tolerance for experimentally persuaded pain in compared to males. Neck flexors and extensors are approximately 20-30% weaker in women than in men, consequently muscles may fatigue faster in females reducing capacity of cervical stability (Brotzman, S. B., & Manske, R. C., 2011).

Physical therapy role in treating neck pain refers to non-medical therapy counting advices, instruction, manual treatment, heating or electric methods, particular exercises or Pilates (Wells, C., et al., 2012), acupuncture, and joint manipulation. No physical therapy modality is superior to another and the choice of treatment should be weighed against potential effects and patient's responses (Teo, S. Y., & Loy, F. L., 2015).

Reflexology was proved as being beneficial alone or as an aide to medical treatment of pain (Samuel, C. A., & Ebenezer, I. S., 2013). It was also proved that reflexology has an effect on increasing the cardiac index (Charlton, J.,

et al., 2011), reducing low back pain, headache, stroke, multiple sclerosis, peripheral neuropathy in diabetes mellitus and asthma (Quinn, F., et al., 2008). It was found that it improved the individual effects such as: observed anxiety, exhaustion, also depression. On the other hand, there was no upgrading of objective measures as cortisone level, arterial blood pressure or heart rate (Song, H. J., et al., 2015). Recently, Marican, N. D., et al., (2019) reported that Reflexology can be used as a modality in manipulative and body based Method Peter, I., et al., 2020). Considering safe use of this technique, Smith, C. A., et al., (2018) reported using reflexology with massage, and other manual methods for pain management in labour.

Material and Method

Subjects

Thirty post-menopausal female office workers, with CMNP, their ages ranged from 50-60 years old, suffering from nonspecific pain for more than at least three months. They were medically checked to be free from any organic musculoskeletal neck pathology. Subjects were divided randomly into two groups. The study (group A= 15) participated in a reflexology treatment program consisted of weekly reflexology sessions, while the second group (B= 15) underwent simple self-stretches exercises only, and considered as a control. Consent forms were signed by all participants. This study was approved by the ethical committee of the faculty of Applied Medical Rehabilitation Sciences, King Abdul-Aziz University (FMRS-EC2022-015).

Inclusion Criteria: In the present study we included female office workers, age ranged from 30-40, suffering from CMNP "started more than 3 months" with normal neck x-ray which indicates mechanical causes.

Exclusion Criteria: Subjects were free from any of the following conditions: diabetes, hypertension, any heart conditions, osteoarthritis, rheumatoid arthritis, cancer, heavy varicose veins, lymphatic edema, epilepsy, anemia, fever, infectious disease, kidney stones, any fractures, wound or any conditions on the foot, foot or neck surgeries.

Assessment tools included head goniometer for range of motion (ROM), manual muscle test (MMT) for muscle strength, visual analogue scale (VAS) for pain intensity, Northwick Park Neck Pain Questionnaire was used for measuring the degree of disability.

Treatment tools included a therapeutic bed, stool, alcoholic gel, foot message cream, towels and pillows (Figure 1).

Method

ROM, muscle strength, pain intensity and degree of disability were assessed before and after the treatment.

The study group had 20 minutes of reflexology sessions twice a week for 4 weeks (8 sessions). Sessions were done in a quiet and relaxing environment using the sounds of nature as a background for the relaxation process. Patients were instructed to wash their feet before the sessions and the therapist also sterilized her hands before and after the sessions.

During each session the therapist applied reflexology along with normal foot massage as follows for each foot:

1- Started with normal foot massage technique (for 1 minute).

2- Reflexology technique (for 8 -10 minutes) which includes a firm pressure on the reflex points by using the "thumb walking" technique on the area on the sole of the foot that represents the neck area, which is the neck of all the toes of both feet.

3- End with the same relaxation technique which we started with (for 1 minute).

Patients were instructed to drink at least 8 ounces of water a day during the treatment period to release toxins based on recommendations by Dreyfuss K., (2012).

The control group underwent simple neck muscles self-stretches exercises in-between their work times. For the statistical analysis of data, we used the SPSS 21 software.

Results

The data obtained in the current study indicated that, there was a substantial improvement in neck pain, ROM, muscular strength and activity of daily living, in addition to a decrease in sedentary behaviour in study group. While there were no significant changes in most of the investigated parameters in the control group ($p<0.05$) (Table 1, 2).

Results seen in table 2 of the study group reveals that there is highly significant improvement in pain, activities of daily living. While no significant changes were seen in the other parameters (Table 3).

Results of the control group in table 2 reveal very highly significant improvement in pain, ADL, ROM, neck flexors, extensors & Rt side rotators strength. But not for neck extension, side bending or rotation ROM.

Results seen in figure 1 shows a strange notice, comparing results of both groups. For the experimental group, according to VAS, there was a significant pain reduction from 29.4 pre-intervention, to be 11.8 post-intervention. While for the control group pain was raised from 23 pre-interventions to be 31.63 post-intervention. There might be other factors impeded their progress, rather than the study variables. This supports the magic effect of reflexology, maybe there were other factors to be studied in future studies (Table 4).

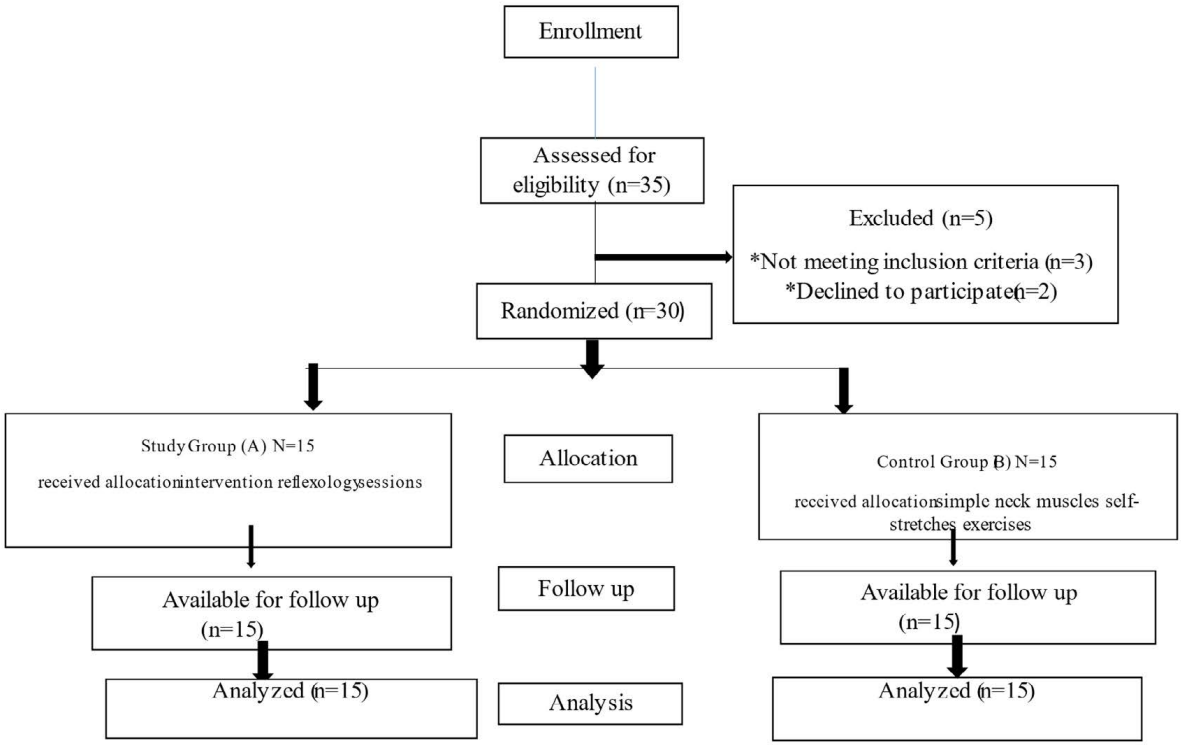

Figure 1. Consort flow diagram of the study.

Table 1. Demographic data of subjects in both groups (A&B).

Variables	Group (A)		Group (B)			
	Mean	± SD	Mean	± SD	t -value	Level of significant
Age (yrs)	55.60	± 3.12	57.5	± 5.00	0.817	P< 0.1879
BMI (Kg/m^2)	34.60	± 3.10	32.53	± 3.247	0.978	P< 0.432

SD: standard deviation, T: test statistic, P: probability > 0.0

Table 2. Mean value and significance of pain, muscle strength, ROM and ADL in study group before and after intervention.

Study	Pre-treatment		Post-treatment		P-value
	Mean	±SD	Mean	±SD	
Pain	29.4	9.1	11.8	7.8	.000
ADL	33.98	0.6	13.67	1.3	.000
Muscle strength					
Flexion	3.6	1.6	4.6	0.62	.037
Extension	4.3	.6	4.75	0.45	.004
Rotation (Rt)	4.2	0.83	4.75	0.45	.007
Rotation (Lt)	4.5	.52	4.75	0.45	.041
Side bending (Rt)	4.31	0.60	4.69	0.48	.009
Side bending (Lt)	4.31	0.79	4.69	0.48	.009
ROM					
Flexion	44.7	0.84	61.88	8.12	.003
Extension	49.7	5.4	63.4	0.76	.007
Rotation (Rt)	65.3	5.22	75.4	5.2	.005
Rotation (Lt)	55.3	7.1	77.2	5.1	.000
Side bending (Rt)	45	3.42	63.5	0.25	.008
Side bending (Lt)	39.9	6.2	53.13	3.6	.003

Results seen in table 2 of the study group reveals that there is highly significant improvement in pain, activities of daily living. While no significant changes were seen in the other parameters.

Table 3. Mean value, significance of pain, muscle strength, ROM and ADL in control group before and after.

Control	Pre-treatment		Post-treatment		p-value
	Mean	±SD	Mean	±SD	
Pain	23	8.96	31.63	9.86	.003
ADL	32.4	6.84	36.38	8.16	.013
Muscle strength					
Flexion	4.63	0.50	3.75	0.45	.000
Extension	4.5	0.73	3.38	0.50	.000
Rotation (Rt)	4.13	0.62	3.38	0.50	.001
Rotation (Lt)	4.25	0.45	3.63	0.50	.000
Side bending (Rt)	4.25	+.68	3.5	0.52	.009
Side bending (Lt)	4.38	+.50	3.25	0.45	.000
ROM					
Flexion	60	7.75	51.25	9.92	.000
Extension	47.5	1.25	43.13	6.8	.125
Rotation (Rt)	57.5	5.28	55.7	3.02	.478
Rotation (Lt)	69.4	4.71	58.8	15	.000
Side bending (Rt)	41.9	8.9	40	2.65	.319
Side bending (Lt)	45	5.49	41.9	2.4	.244

Comparing both group results reveals very high significant changes in most of the measured parameters, in favour of the experimental group, which assure that reflexology is beneficial & excellent tolerable technique of treating CMNP.

Discussion

CMNP is considered the most common disability for office workers. Classically, it comes from wrong habits (e.g. humble posture, bad designed seats, and improper twisting and carrying movements. CMNP could be treated by many methods of physical therapy including: massage, hot packs, electrotherapy and different types of exercises.

Reflexology technique is one of the complementary methods proved to be effective with different types of disorders; and in this study we aimed to determine its effect on pain, ROM, muscle strength, and ADL in female office workers suffering from chronic mechanical neck pain.

The results showed optimistic outcomes and variance among study and control groups by matching both group results after one month of treatment. We found that reflexology significantly improved ROM (more to the Rt. side, which might be due to the Rt handedness of the majority of persons), muscle strength, and ADL in middle aged female office workers.

Some studies proved that reflexology had the same positive effect on different types of musculoskeletal conditions. A study applied reflexology on a sample of chronic low back pain persons (CLBP) for 3 sessions per week, for 3 weeks, and the other study applied reflexology on a sample of non-specific LBP once a week for 6 weeks. Noted progress was found in both studies (Song, H. J., et al., 2015, Sanchis-Sánchez, et al., 2020). On the other hand, efficiency of reflexology for CLBP was studied in 243 cases; they were randomly distributed to three groups: relaxation, reflexology, and non-intervention. No significant noted variations between after and before treatment for pain and function,

Table 4. Mean value, significance of pain, muscle strength, ROM and ADL in both groups after intervention.

Groups	Study		Control		P-value
	Mean	±SD	Mean	±SD	
Pain	11.8	7.8	31.63	7.8	.000
ADL	13.67	1.29	36.38	8.16	.000
Muscle strength					
Flexion	4.6	0.62	3.75	0.45	.000
Extension	4.75	0.45	3.38	0.50	.000
Rotation (Rt)	4.75	0.45	3.38	0.50	.000
Rotation (Lt)	4.75	0.45	3.63	0.50	.000
Side bending (Rt)	4.69	0.48	3.5	0.52	.000
Side bending (Lt)	4.69	0.48	3.25	0.45	.000
ROM					
Flexion	64.69	6.2	51.25	9.9	.013
Extension	63.45	0.8	43.13	6.8	.000
Rotation (Rt)	75.4	5.2	55.63	3.02	.003
Rotation (Lt)	77.19	5.1	58.75	5.0	.006
Side bending (Rt)	63.5	0.25	40	2.65	.008

but there was a reduced pain which was greater in reflexology group (El-Gendy, S., et al., 2015).

Other studies suggested specific effects of reflexology for improving non-musculoskeletal symptoms such as the quality of life and a positive instant result on pain for cancer cases (Hodgson, H., 2000, Baljon, et al., 2020).

In the present study, the patients also noticed a change in their psychological state and a decrease in their fatigue, and this effect was proved in another study that compared the effect of reflexology and relaxation techniques on reducing fatigue, reflexology was proved to be more effective than relaxation. This comes in agreement with Mustafa, G., 2020). Additionally, following foot reflexology technique for twenty-three patients with breast or lung cancer, patients showed a significant decline in anxiety (Stephenson, N. L., et al., 2000). But one study found no significant effect of reflexology on anxiety and depression of early breast cancer patients (Sharp, D. M., et al., 2010).

Studies on reflexology bring about significant progress in subjective results as observed stress, fatigue, and depression, but it hasn't been proved to have a significant objective outcome as cortisol levels, arterial blood pressure, and heart rate (Song, H. J., et al., 2015). In addition to what was mentioned by Chandrasekar, S., et al., (2019), who designed an electronic enabled organic cotton house slipper for foot reflexology treatment. Interestingly, more positive & optimistic results regarding reflexology as safe treatment technique, this was reported by Unlu, A., et al., (2018) who recommended reflexology in treatment of cancer & its pain. Recently, subjective entitlements are similarly growing for traditional and complementary medicine (TCM) relating in what way disorders as joint inflammation, migraine, and MS can be relieved (Marican, et al., 2019 & 2021).

Limitations

The authors of this study encountered the following limitations:

1. Time limitations to examine the long-term effects of reflexology.

2. No objective clinical laboratory results were taken, as not all participants agreed to go through blood analysis.

Conclusion

We can conclude that reflexology is an acceptable, effective, safe and non-invasive complementary treatment for chronic mechanical neck pain.

Authors' contributions

Dr. Salwa Elgendy came up with the study idea, with the responsibility in protocol drafting, reference search, data collection, writing and final proof of the manuscript, editing the manuscript, data collection process. Dr. Heba Embaby helped in practical part of the study and statistical analysis of data.

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