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Qigong training and effects on stress, neck-shoulder pain and life quality in a computerised office environment

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A B S T R A C T

Background: Qigong is a Chinese health promoting exercise with a rhythmic pattern of slow movements and breathing affecting the autonomous nervous system.
Objectives: To examine the implementation of Qigong for half an hour daily in a computerised office, and to study effects on health state, general health, neck-shoulder and lumbar spine symptoms and stress after six weeks training
Design: A crossover intervention study with 37 employees randomised in two groups. A questionnaire was completed one week before starting study and every second week during the training period. After 6 weeks the first group stopped and the second group started the training.
Results: There was a small significant improvement of neck pain and disability following therapy.
Conclusion: Qigong training may reduce neck disability in office workers. A longer training period might be needed in further Qigong studies in healthy, normal populations.

1. Introduction

Qigong is a traditional Chinese energy exercise used for cultivating the body and mind as well as for therapy. Written records of Qigong exercise can be traced back to 500–1000 BC. Chinese doctors prescribe medical Qigong exercises in the same way Western doctors prescribe physical therapy.[1] Qigong is considered as a self-training method of adjusting body posture, breathing and mentality, with the overall aim being to achieve an optimal state of body and mind.[2] The training is a group activity performed under harmonious conditions.[3] It includes a series of rhythmic pattern of movements performed in a slow tempo, where posture, breathing and inner balance influence the autonomous nervous system. The bodily movements focused upon are balance, concentration and coordination. A balance between the sympathetic and parasympathetic nervous system is achieved using slow breathing techniques.[1,4–8] To become skilful in Qigong[9] techniques a training period from between ten weeks to one year of regular practice occurs depending on individual ability.[3]

There are an increasing number of scientific publications on Qigong training. A review of the Qigong literature published in PubMed from 1982 to 2009, identified 23 articles, detailing the effects of this therapy on subjects with differing medical conditions including psychiatric disorders,[10] cancer,[11,12] rheumatic pain and disability,[5] musculoskeletal disabilities,[6,13–15] neurological dysfunction,[16–19] cardiovascular disease[9,20–26] and psychological health effects.[27–29]

The intervention study is performed as group training directed by a Qigong master. The studies mostly consist of an intervention group and a control group. No previous study using a crossover design was found. Most publications studied Qigong training in patient groups however, few western studies have investigated effects of Qigong in a normal population, or at the work place.[7,30] A small Qigong study was conducted in a computerised office environment, which indicated a reduction of low-back symptoms, lower noradrenaline excretion in urine, and reduced heart rate and finger temperature indicating reduced activity of the sympathetic nervous system.[30] In another study, a Qigong training program was introduced in hospital staff. The Qigong group demonstrated a significant reduction in perceived stress as compared to the control group.[7] This suggests that there is a need for more studies about Qigong training in daily work life of normal working population as a method to reduce stress in every day life.

The aim of this study is to examine if Qigong could be implemented among workers in a computerised office environment. Moreover, to study the effects on Qigong training in office workers on symptoms in the neck, shoulders and lumbar spine region as well as perceptions of stress and life quality. The study was approved by the ethics committee at the regional ethical board in Uppsala, Sweden. The following six research questions were tested:

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1. Could Qigong be implemented in a computerised environment in a western country?
2. Could perceived health be influenced by Qigong?
3. Is graded health influenced by Qigong?
4. Could symptoms of neck, shoulder and lumbar spine pain be reduced by Qigong?
5. Could Qigong reduce stress?
6. Could quality of life be influenced by Qigong?

2. Material and methods

2.1. Settings and study design

The study was performed at a local office in one large international company in the electronic and electro technical sector. The participants were involved in administrative, selling and teaching duties with daily use of computers. Teaching and selling personnel were partially working with external customers which could mean travel to other cities.

The study was carried out using a crossover design with each participant serves as their own control, thereby controlling for participant specific covariates as well as any baseline unbalance by design. All participants ($n = 42$) were randomised into two groups whereupon group one trained Qigong and group two performed daily regular work over a period of six weeks. After a wash-out period of one week the groups switched so that group one performed regular work and group two performed Qigong for six weeks.

2.2. Statistical analyses

Associations between Qigong training and the various outcomes were analyzed using linear mixed effects models with random intercepts at individual levels. The models included adjustment for treatment sequence (i.e. work for the first period and Qigong for the second period or vice versa) for weeks one through six or weeks eight through thirteen. The model assumes that the residuals and the individual-specific random intercepts are normally distributed. These assumptions were assessed by visually inspecting normal quintile plots of the residuals' and the random intercepts' distributions. Plots of the residuals versus quantiles of the normal distribution generally showed no gross deviations from normality of the residuals. Coefficients for changes with 95% confidence intervals were calculated from the models. Significant change occurs if 0 is not included in the CI, and a negative coefficient indicates an improvement.

2.3. Qigong training

The Qigong training was performed as a group activity watching a video daily 17–25 min during working days before lunch time. All participants were given practical information about using the video equipment. One person from each group was chosen by their colleagues to document the list of those present and to manage the technical equipment.

The longer session of 25 min consisted of movements, breathing and verbal instruction while the 17 min version consisted of the same movements with simultaneous breathing. The training took place at a conference room with video equipment. A Qigong master demonstrated the content of the training program video, Heart of the Qigong (Shuxingpingxegong). The study leader introduced and joined participants during the first three days during week 1,to allow participants to ask questions. After one week the 17 min version of the Qigong program was used. The training was accompanied by the same music. A DVD version was available for participants who were on business trips, so allowing subjects to continue training when staying in a hotel room.

2.4. Assessment of health effects

A week before the six week study period started, all participants answered a baseline questionnaire about health state, health grading Euroqol,[31] grading of pain intensity in neck/shoulder[14] lumbar spine[35] and grading of stress.[32] The same questionnaire was sent to all participants every second week during the six weeks period. This was answered on a Friday afternoon. The last questionnaire to the Qigong group included an additional questionnaire relating to prevalence of absence and reasons for absence.

Self-reported general health was assessed by two different instruments. A rating scale originated from EQ5D was used. It has a visual analogue scale (similar to a thermometer) to assess current health related quality of life state. The scale ranges from 0 to 100, with 100 as maximum health.[33] The second instrument is questionnaire SF12, which is a short version of SF-36. The questions were summed up in two scales; one relating to physical health, (score 6–20) and one for mental health (score of 6–27).Higher scores indicated a better general health state.[34]

A validated questionnaire (von Korff's) was used to grade the severity of chronic pain and reduced function in neck/shoulder and lumbar spine region.[35] Three questions addressed pain intensity in the neck/shoulder region[1] "How would you rate your neck/shoulder pain at the present time, that is, right now?"[2] "In the past 7 days how intense was your worst pain? and[3] "In the past 7 days how intense was your pain on average?" Responses were rated using an 11-point scale, in which " 0 "indicated "no pain," and " 10 " "extreme pain." The pain intensity score comprised of the sum of the 3 items, multiplied by 10 and divided by 3.[35]

A further 3 questions were asked relating to neck/shoulder pain:

1) "In the past 7 days, how much has neck/shoulder pain interfered with your daily activities?"

Responses were rated on a 10-point scale, with "0" was "no interference," and "10": "unable to carry out any activities";

2) "In the past, how much has neck/shoulder pain changed your ability to take part in recreational, social, and family activities?"
3) "In the past 2 weeks, how much has neck/shoulder pain changed your ability to work (including housework)?" The answer "0" meant "no change," with "10" referring to "extreme change". The reduced function score was the sum of the 3 items multiplied by 10 and divided by 3.

The same procedure was performed concerning the three questions on low-back pain intensity and another three questions relating to lower back function/disability.[36]

Finally, a rating scale concerning stress grading according to Borg's rating was used. This measured perceived stress, with possible scores from 6 to 20 during the latest 7 days.[32]

An additional questionnaire given to the Qigong group in the end of the six weeks contained questions concerning frequency of absence from the training, and fourteen questions concerning reasons of absence.

3. Results

3.1. Group characteristics

In total 42 out of 300 invited persons were recruited for the study. They consisted of nine men and thirty three women. The

Table 1
Background data for the study Group ($N = 37$).

	Men ($n = 8$)	Women ($n = 29$)
Age[a]	51, (39–52)	46, (42–53, 5)
Former smoker	4, (50%)	19, (65, 5%)
Current smoker	0, (0%)	2, (6, 9%)
Asthmatic	0, (0%)	2 (6, 9%)

[a] presented as median (25th percentile and 75th percentile).

mean age was 48 years (range 42–54). After recruitment four women and one man left the study (12% dropouts). Totally four of the dropouts were non smokers, one was former smoker. One of the dropouts was asthmatic. Accordingly the remaining group of participants ($n = 37$) consisted of 8 men and 29 women (Table 1).

Data on the health variables and numerical data before and after Qigong training is presented in Table 2. The general mental and physical health was good. The health related quality of life was numerically improved from 70% before to 76% after Qigong, and there was a numerical reduction of pain intensity in the neck from 32 to 23 points. There was a numerical reduction of neck disability from 5 to 4 points after the training (Table 2).

The coefficients and the 95% confidence interval for the linear mixed model are given in Table 3. The only significant effect of Qigong training was the reduction concerning disability neck. (Table 3).

3.2. Documentation of absence

The total number of presence among all participants was on average 4 times weekly during the six weeks training period, according to the participation lists. On average, each participant participated 25 out of 30 training sessions (range 23–36). Number of subjects at least once being absent were as follow for different reasons: illness (9 persons), contact with caretaker (2 persons), business trip (11 persons), holiday (13 persons), higher priority for work tasks than Qigong training (20 persons), and low level of motivation (1 person). One person could be absent for different reasons.

4. Discussion

The study showed that it was possible to implement Qigong training among workers in a computerised office environment.

Table 3
Changes of variables after Qigong by linear mixed model.

Changes of variables	Used scale	Coefficient	95% CI of change
Physical health	SF12	−0.06	− 0.36 to 0.24
Mental health	SF12	0.003	− 0.42 to 0.49
Pain intensity neck	von Korff	0.12	− 0.17 to 0.41
Disability neck	von Korff	−0.29	− 0.52 to − 0.07
Health related quality	EQ	0.78	− 1.08 to 2.64
Perceived stress	Borg	−0.05	−0.50 to 0.40

Some partial absences was noted, but on average subjects were present on 25 out of 30 sessions. We found a significant improvement relating to neck pain disability, a symptom which is common in office staff.[37] One study discussing the possible benefits of Qigong on lower back pain noted that the main posture of Qigong training is similar to the recommended posture for office workers but seldom practised.[13] In a previous office study, Qigong training over a five-week period reduced low-back pain symptoms from computerised office work.[30] One study addressing subjects with long-term non specific neck pain indicated reduced pain levels and increased mobility following three months of Qigong training.[6]

There could be different reasons for the limited health improvements of the training. For instance, the relatively short training period (six weeks). As previously indicated, training periods vary between ten weeks and twelve months of regular practice.[3,6,9,26] One Qigong study have observed significant health improvements in stress reduction following a six weeks training period.[7] Another reason could be that there may be a higher proportion of healthy subjects in the working office population, thus improvements in mobility, pain and quality of life may be reduced. Nevertheless, the cohort studied were all from an office environment and acted as their own controls. However, a larger study population is needed to evaluate these findings more fully. Alternatively, an intervention study could be restricted to those subjects identified with higher scores e.g. high stress level or musculoskeletal symptoms.

A further reason for the limited observed effect could be the Qigong method. The use of a video instead of personal training by a qigong master could have affected the actual techniques practised. Conversely, the video offers a standardised approach to all subjects and excludes personal bias and subjective influences including recall bias resulting from expectations of Qigong master. It is suggested that a trainer be present for the first three sessions of the video procedure at commencement of the training program, to ensure all participants are cognisant with the movements and

Table 2
Total numbers of variables without and after Qigong. ($N = 37$) Mean, median values and the 25th and 75th percentiles.

Variables	Used scale	Possible points	Mean	Median	25th Percentile	75th Percentile
Physical health	SF12	6–20				
No Qigong			16	17	15	18
After Qigong			17	17	14	19
Mental health	SF12	6–27				
No Qigong			20	20	18	24
After Qigong			22	24	21	25
Pain intensity neck	Korff	0–100				
No Qigong			32	32	0	60
After Qigong			23	15	0	43
Disability neck	Korff	0–100				
No Qigong			5	0	0	7
After Qigong			4	0	0	0
Health related quality of life	EQ	0–100				
No Qigong			70	73	60	82
After Qigong			76	80	65	90
Perceived stress	Borg	6–20				
No Qigong			13	14	11	15
After Qigong			12	13	10	15

techniques required of them. There are a number of other qigong studies reporting significant effects of Qigong training by using video (5, 9, 26, and 30).

Finally, the limited observed health effect could be due to the crossover design. The advantage with the crossover design is that each subject serves as their own control, which increases the power of the study. Moreover, recall bias due to differences in expectations would be less, since both groups are aware they will receive training.

In conclusion, video based Qigong training can be implemented in a computerised office environment resulting in a with high participation rate during the study period among those initially choosing to participate. The observed health improvements were limited to reduced neck disability. A longer training period could be beneficial in future studies.

Conflict of interest

None of the authors had any financial or personal relationship with persons or organisations that could inappropriately influence the study.

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