ผลของโปรแกรมการออกกำลังกายเพื่อป้องกันออฟฟิศซินโดรมต่อระดับความเจ็บปวดกล้ามเนื้อคอ บ่าไหล่และหลังส่วนต้นในกลุ่มวัยทำงาน

An Effect of the Exercise Program for Office Syndrome Prevention on Pain Levels of Neck, Shoulder and Upper Back Muscle among Working-age Individuals

นิพนธ์ต้นฉบับ **Original Article**

ผุสดี ก่อเจดีย์[1]* และ อชิระ ก่อเจดีย์[2]

[1] คณะพยาบาลศาสตร์มหาวิทยาลัยนานาชาติเซ็นต์เทเรซา อำเภอองค์รักษ์จังหวัดนครนายก 26120
[2] โรงพยาบาลบางปะกอกอินเตอร์เนชั่นแนล จอมทอง กรุงเทพฯ 10150

* Corresponding author: kpudsadee@yahoo.com

วารสารไทยเภสัชศาสตร์และวิทยาการสุขภาพ 2568;20(4):371-379.

Pudsadee Korjedee[1]* and Achira Korjedee[2]

[1] Faculty of Nursing St.Teresa International University, Ongkharak, Nakhonnayok, 26120 Thailand
[2] Bangpakok International Hospital, Chom Thong, Bangkok 10150, Thailand

* Corresponding author: kpudsadee@yahoo.com

Thai Pharmaceutical and Health Science Journal 2025;20(4):371-379.

บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาเปรียบเทียบผลของโปรแกรมการออกกำลังกายเพื่อป้องกันออฟฟิศซินโดรมต่อระดับความเจ็บปวดที่กล้ามเนื้อคอ บ่าไหล่และหลังส่วนต้นระดับความเจ็บปวดของกลุ่มวัยทำงานก่อนและหลังการทดลอง และเปรียบเทียบผลโปรแกรมการออกกำลังกายเพื่อป้องกันออฟฟิศซินโดรมต่อระดับความเจ็บปวดที่กล้ามเนื้อ คอ บ่าไหล่และหลังส่วนต้นระดับความเจ็บปวดของกลุ่มวัยทำงาน ระหว่างกลุ่มทดลองและกลุ่มควบคุม **วิธีการศึกษา:** เป็นการวิจัยกึ่งทดลอง (Quasi-experimental research) แบบสองกลุ่ม วัดก่อน-หลังการทดลอง กลุ่มตัวอย่างเป็นข้าราชการและเจ้าหน้าที่ของเทศบาลเมืองสระบุรี เทศบาลตำบลตาล-พระยาทดและองค์การบริหารส่วนตำบลดาวเรือง ที่ปฏิบัติงานจริง ประจำปีงบประมาณ 2567 จำนวน 112 คน คัดเลือกโดยวิธีเฉพาะเจาะจง กลุ่มทดลอง ทำกายบริหารตามโปรแกรมการออกกำลังกายเพื่อป้องกันออฟฟิศซินโดรม 5 ท่า จำนวน 6 ครั้ง/วัน ทุกวัน จันทร์ถึงศุกร์ เป็นระยะเวลานาน 4 สัปดาห์ มีจำนวนออกกำลังกายทั้งหมด 30 ครั้ง/สัปดาห์ กลุ่มควบคุมได้รับสุขศึกษาการส่งเสริมสุขภาพป้องกันและแก้ไขกลุ่มอาการออฟฟิตซินโดรม ก่อนการทดลอง(0 สัปดาห์) กลุ่มตัวอย่างวัด อาการปวดของกล้ามเนื้อ คอ บ่าไหล่ และหลังส่วนต้น ด้วยเครื่องมือแบบประเมินความปวด (Pain Score) และภายหลังการทดลอง(4สัปดาห์) ให้กลุ่มตัวอย่าง ประเมินอาการปวดกล้ามเนื้อคอ บ่าไหล่ และหลังส่วนต้น แล้วนำมาวิเคราะห์ข้อมูลโดยใช้สถิติ ร้อยละ ค่าเฉลี่ย ส่วนเบี่ยงเบนมาตรฐาน Paired T–Test และ Independent T–Test **ผลการศึกษา:**พบว่า โปรแกรมการออกกำลังกายเพื่อป้องกันออฟฟิศซินโดรมต่อระดับความเจ็บปวดที่กล้ามเนื้อบ่าไหล่ระดับความเจ็บปวดของกลุ่มวัยทำงานมีความแตกต่างอย่างมีนัยสำคัญทางสถิติระหว่างก่อนและหลังเข้าโปรแกรมในกลุ่มทดลอง ($p = 0.001$) ในขณะที่อาการปวดคอและหลังส่วนต้นมีแนวโน้มลดลงแต่ยังไม่ถึงระดับนัยสำคัญ ($p = 0.062$ และ 0.058 ตามลำดับ) การเปรียบเทียบระดับอาการปวดกล้ามเนื้อก่อนและหลังการเข้าร่วมโปรแกรมของกลุ่มควบคุม พบว่าอาการปวดคอ บ่าไหล่ และหลังส่วนต้นลดลงเล็กน้อย แต่ไม่มีความแตกต่างอย่างมีนัยสำคัญทางสถิติ ($p > 0.05$) ผลต่างของคะแนนเฉลี่ยก่อน–หลังในกลุ่มทดลองมากกว่ากลุ่มควบคุมในทุกตำแหน่งของกล้ามเนื้อแต่ไม่มีนัยสำคัญทางสถิติ **สรุป:**โปรแกรมการออกกำลังกายเพื่อป้องกันออฟฟิศซินโดรมช่วย ลดระดับอาการปวดบ่าไหล่ ควรส่งเสริมให้นำโปรแกรมนี้ไปปรับใช้ ในกลุ่มพนักงานออฟฟิศเพื่อลดปัญหาออฟฟิศซินโดรม โดยเฉพาะอาการปวดบ่าไหล่

คำสำคัญ: โปรแกรมการออกกำลังกาย ออฟฟิศซินโดรม วัยทำงาน เจ็บปวด

Abstract

Objective: To compare the effects of exercise programs to prevent office syndrome on the pain levels of the muscles in the neck, shoulders, and upper back, and the pain levels of working-age groups before and after the experiment. To compare the effects of exercise programs to prevent office syndrome on the pain levels of the muscles in the neck, shoulders, and upper back, and the pain levels of working-age groups between the experimental group and the control group. **Methods:** This experiment is a Quasi-experimental research with two groups, measured before and after the experiment. The sample group consists of civil servants and officers from Mueang Saraburi Municipality, Ton Tan - Phraya Thot Municipality, and Dao Rueang Subdistrict. Administrative organizations currently working in fiscal year 2024, with a total of 112 participants, were selected using specific methods. The experimental group performed physical exercises according to the exercise program to prevent office syndrome, consisting of 5 postures, 6 times/day, every Monday to Friday for 4 weeks, totaling 30 exercises per week. The control group received health education to promote health, prevent, and alleviate symptoms of office syndrome before the experiment (Week 0). The sample group measured the pain in the muscles of the neck, shoulders, and upper back using the Pain Score tool. After the experiment (4 weeks), the sample group assessed the pain in the muscles of the neck, shoulders, and upper back. The data were analyzed using statistics, including percentages, means, standard deviations, Paired T-Tests, and Independent T-Tests. **Results:** The results showed that the exercise program was effective in reducing pain in the muscles of the shoulders and upper back associated with office syndrome. The pain level of the working-age group was significantly different before and after the program in the experimental group ($p = 0.001$). In comparison, the pain in the neck and upper back tended to decrease but did not reach the significance level ($p = 0.062$ and 0.058, respectively). Comparing the level of muscle pain before and after the program in the control group, it was found that the pain in the neck, shoulders, and upper back was slightly reduced; however, there was no statistically significant difference ($p > 0.05$). The difference in mean scores between before and after in the experimental group was higher than in the control group in all muscle positions, but it was not statistically significant. **Conclusion:** The exercise program to prevent office syndrome helps reduce the level of shoulder pain. The program has been demonstrated; it should be promoted and applied for implementation. To reduce office syndrome problems, especially shoulder pain, among office workers.

Keywords: exercise program, office syndrome, working age, pain

Editorial note
Manuscript received in original form: July 28, 2025;
Revision notified: September 13, 2025;
Revision completed: October 14, 2025;
Accepted in final form: October 22, 2025;
Published online: December 31, 2025.

Journal website:
http://ejournals.swu.ac.th/index.php/pharm/index

Introduction

Office syndrome is a group of symptoms that occur in office workers, using muscles in improper postures or using those muscles repeatedly for long periods of time due to the nature of the work that requires sitting in front of a computer or working in a repetitive posture for a long time. Additional factors include inappropriate workspaces, such as insufficient lighting, desk and chair placement that are too close or too far apart, and individual mental health conditions such as stress. These factors lead to illnesses and abnormalities in various body systems, particularly accumulated muscle pain, neck, shoulder, back, and wrist pain, tension, numbness, and cramps that become chronic, as well as eye fatigue.[1] These symptoms cause tension and stiffness, leading to pain in the neck, shoulders, and upper back. These symptoms are commonly found in people who work at computers for long periods of time, and in people who sit and write or review documents for four or more hours a day.[2] Most people with office syndrome experience discomfort and difficulty moving, which interferes with their work or daily life over the long term. According to a survey of the Thai population, It was found that 60 percent of people are at risk of having office syndrome and there is a tendency for the number of patients with this symptom to increase.[3] In 2021, a study found that the incidence of musculoskeletal diseases (MSDs) was as high as 50,848 per 100,000 people, with a rate of Disability-Adjusted Life Years (DALYs) of 4,592.2 per 100,000 people.[4] Analyses of data from several countries have found that the median prevalence of shoulder pain in the general population is 16 % , with a range from 0.67% to 55.2% depending on the country and sample studied.[5] A study in Thailand found that 37.9% of office workers experienced musculoskeletal pain in the past 7 days, and the most common pain symptoms were neck, shoulder, and lower back pain[6] and a study conducted in the Northeastern region of Thailand found that the prevalence of musculoskeletal pain in the past 12 months was 96.46%, with the most common symptoms being pain in the wrists, fingers and neck.[7] Furthermore, a study at the Princess Maha Chakri Sirindhorn Medical Center found that although the ergonomic risk assessment using the Thai ROSA tool showed low risk, musculoskeletal pain, particularly in the neck and lower back, persisted, indicating the need for improvements to the work environment.[8]

Ergonomic threats are working postures such as standing, sitting, moving, lifting or moving objects. Repetitive movements, standing, bending for long periods of time are the causes of office syndrome symptoms.[1,4] Working with a computer continuously for more than 4 hours a day increases the risk of musculoskeletal fatigue from work, resulting in aches and pains. Proper working posture and appropriate rest periods help prevent office syndrome symptoms.[1] Regular exercise while working or stretching exercises to exercise muscles and tendons will help reduce pain and fatigue of muscles and tendons.[1]

Office Syndrome affects both physical and mental health, including employee productivity. Physically, neck and back pain are common symptoms in office workers, affecting their quality of life and productivity.[9] Sitting for long periods without moving increases the risk of cardiovascular diseases such as high blood pressure and stroke.[10] Psychological effects working in an unhealthy environment and lack of movement can increase stress and lead to depression (WHO). It also affects work efficiency. Pain and stress can reduce employees' productivity and performance, and people with neck and back pain experience decreased work performance and a lower quality of life.[9]

Office syndrome pain levels in working-age people (aged 20–59 years) over the past 5 years showed a high prevalence of musculoskeletal pain, particularly in the neck, back, and shoulders. The most common symptoms were shoulder pain[11], back pain, and neck pain[12], which affected the quality of life and productivity of office workers. Factors associated with pain include age, work environment, and stress. Those over 40 years of age who have worked for more than 20 years are at risk of back and neck pain.[13] Sitting in an improper posture or sitting for long periods without changing positions increases the risk of musculoskeletal pain.[14] Changing your work position every hour helps prevent muscle pain[6].

Stretching exercises while working are exercises for the muscles in the neck, shoulders, and scapular to prevent muscle tension. Regularly exercising muscles and tendons, including getting up, changing positions, and exercising

muscles every hour, will help increase muscle strength, reduce muscle and tendon fatigue, and reduce muscle pain.[1,4] A six-month study examined the effects of an office exercise program that included improvements in flexibility, strength, and balance during each workday. A reduction in pain was found in several areas including the shoulders, neck and back, with significant improvements in physical function, flexibility and muscle strength ($p = 0.000$).[15] Meta-analysis studies have shown that exercise programs can help prevent neck muscle pain. Reduce the risk of neck pain by approximately 53%.[16] A 12- week program of posture modification in office workers combined with exercise showed percent reduction in the severity of neck muscle paina.[17] In addition, past research studies have found that massage and physical exercise can reduce pain in the neck, shoulders, and back.[18,19] Innovative products have been developed to reduce neck and shoulder muscle pain in office syndrome patients, including innovative pain-reducing acupressure sticks[20] and shoulder rest vests[21].

Previous research studies have focused on samples of office syndrome patients in working-age groups of various occupations, which differs from this study. The sample consisted of office workers with specific work characteristics and environmental factors, namely, office staff or employees who work in an office setting and sit at a computer for long periods. The benefits of this research include guidelines for health promotion and prevention of office syndrome among computer workers. The researchers are interested in developing a program to prevent office syndrome in office workers who sit at a computer for at least four hours a day. They are encouraged to change postures and engage in physical exercises every hour to prevent and reduce neck and shoulder muscle pain. This program aims to promote and prevent office syndrome among working-age individuals.

Research Question

1. After participating in the exercise program to prevent office syndrome, is the pain level in the neck, shoulders, and upper back muscles less than before the experiment?
2. The experimental group had less pain in the muscles of the neck, shoulders and upper back than the control group, is that right?

Research hypothesis

1. After participating in the exercise program to prevent office syndrome, there was less pain in the muscles of the neck, shoulders and upper back than before the experiment.
2. The experimental group had less pain in the muscles of the neck, shoulders and upper back than the control group.

Research objectives

1. To compare the effects of exercise programs to prevent office syndrome on the pain levels of muscles in the neck, shoulders and upper back of working-age groups before and after the experiment.
2. To compare the results of exercise programs to prevent office syndrome on the pain levels of muscles in the neck, shoulders and upper back of working-age people between the experimental group and the control group.

Conceptual framework

Physiological theories on the mechanisms of muscle pain (Pain Theory) Pain perception is a coordination of cells in the nervous system at three levels: 1) the spinal cord receives pain signals, 2) nerve fibers carry signals up to the brain, and 3) nerve cells that transmit nerve signals. When pain receptors release chemicals such as Histamine, Potassium, Acetylcholine, Serotonine, ATP make nerve fibers sensitive to pain. Muscle pain is a symptom that occurs from improper posture. Staying in one position for a long time causes inflammation in the muscle system, tendons, and connective tissue, causing muscle spasms in the inflamed area. Pain in the neck, shoulders, and upper neck muscles in office syndrome is caused by continuous movement of the shoulder and arm joints for a long time or by repeatedly lifting the arms above the head, causing injury in that area. Such compression causes constriction of arteries and veins (Subclavian artery and vein) and the nerve network that supplies the arm (Brachial plexus) causes pain in the shoulder, neck and arm. Regular exercise helps prevent muscle tension, increases muscle strength, reduces muscle and tendon fatigue and reduces muscle pain.[1,4]

1. Pose 1: Neck-bending pose The motor nerve for this muscle is the Accessory nerve, while sensation and muscle tension pass through the cervical plexus to stretch the Sternocleidomastoid muscle.

2. Pose 2: Tilt your neck left and right. The motor nerve for this muscle is the Accessory nerve, while sensation and tension of the muscle pass through the cervical plexus. The Sternocleidomastoid muscle is innervated by the Accessory nerve or cranial nerve 11 and by the ventral branches of the 3rd and 4th cervical spinal nerves, which in addition to innervate this muscle also innervate the Sternocleidomastoid muscle, as the fibers of this muscle are oriented in various directions to stretch the Trapezius muscle in the neck.

3. Pose 3: Arm bend It is controlled through the axillary nerve , which is a nerve that comes from the cervical spinal nerve, segments 5 and 6 (C 5 , C 6), through the Brachial plexus to stretch the Deltoid muscle, controlling the Biceps brachii muscle, which is the musculocutaneous nerve, which begins from the union of the cervical spinal nerves, pairs 5 , 6 and 7, then joins as a lateral cord in the brachial plexus before penetrating into the Coracobrachialis muscle before giving a branch into the Biceps Brachii muscles tp stretch the Biceps Brachii and Triceps muscles.

4. Pose 4 and 5 Put your hands together and clasp them. The motor nerve for this muscle is the Accessory nerve, while sensation and tension of the muscle pass through the cervical plexus to stretch the Sternocleidomastoid muscle. It is innervated by the Accessory nerve or cranial nerve 11 and by the ventral branches of the 3rd and 4th cervical spinal nerves, which in addition to innervate this muscle also innervate the Sternocleidomastoid muscle, as the fibers of this muscle are oriented in many directions. To stretch the Trapezius muscle, the Biceps Brachii muscle is innervated by the musculocutaneous nerve, which originates from the junction of the cervical spinal nerves 5, 6 and 7, then joins as a lateral cord in the Brachial plexus before penetrating into the Coracobrachialis muscle and giving off branches to the Biceps Brachii muscle to stretch the Biceps Brachii and Triceps muscles.

Methods

Research design

This research is a Quasi-experimental research; Two-group design, pre-and post-experimental measurement.

Population and sample

The population used in the study were officers from Daoruang Subdistrict Administrative Organization, Ton Tan-Phraya Thot Municipal Administrative Organization, and Saraburi Municipal Administrative Organization, as they have similar work characteristics and are areas where the agencies are interested in taking care of the health of their office personnel. The actual work in fiscal year 2024, numbering 112 people who work using computers from 4 hours per day, was obtained from calculations using the G Power program version 3.1.9.4 , calculating the sample size by setting the Alpha level at .05, the Power at .08 and the Effect Size (Medium Effect) at .5. The two-group comparison design[22] calculated the sample size to be 51 people per group to prevent sample loss (Drop Out). The researcher therefore increased the sample size by another 10 percent.[22] Selected a specific sample group (Purposive sampling) of officers working in the offices of the Daoruang Subdistrict Administrative Organization, Ton Tan-Phraya Thot Municipal Administrative Organization as the experimental group. Officers working in the offices of Saraburi Municipal Administrative Organization as the control group with similar

characteristics to the experimental group, by matching according to the criteria of gender, age and nature of work.

The criteria for inclusion in the sample group are as follows:

1. Be an official Actual working in the office, both female and male, and aged 18-59 years.
2. Voluntarily participate in research.
3. There are no restrictions on exercise.

Exclusion criteria

1. Participate in activities less than 80% (exercise less than 24 times).
2. There was a history of injury, muscle and bone tear within 6 months prior to the study.
3. There are treatments for pain such as taking painkillers, physical therapy, acupuncture, massage, or compresses.

The sample size in this research experiment was calculated by using the G Power program version 3.1.9.4 by setting the sampling error (Alpha level) at .05, the effect size at .08, and the experimental effect (Effect Size) at a medium size (Medium Effect). A two-group comparison design[22] calculated sample size of 51 people per group to prevent sample loss (Drop Out). The researcher therefore increased the sample size by an additional 10%.[22] Therefore, the sample size in this research was 56 people from the experimental group and 56 people from the control group, for a total of 112 people.

Research tools

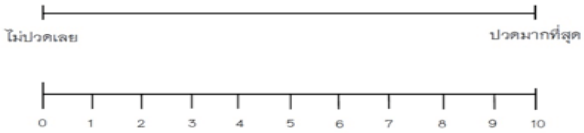
1. Tools used for data collection. The researcher created it by himself through a literature review. By 3 experts, consisting of 2 nursing professors and 1 occupational health nurse, considering the correctness and appropriateness before use by analyzing the internal consistency index (Index of item Objective Congruence; IOC). Questions with IOC values from 0.5-1 have a validity value used in collecting data and questions. Questions with IOC values of at least .5 are adjusted according to the experts' recommendations.

Defining the variables: Office syndrome is pain from repetitive use of the same muscles over a long period of time, and the pain level in Numerical rating scale is an assessment of the level of muscle pain using numbers from 0-10, indicating the severity of the pain.

The tools used to collect this data consist of two parts:

Part 1 : Personal information containing seven items

Part 2 : Pain Score Assessment - This assessment evaluates the level of muscle pain using a pain scale that consists of a straight line divided into 10 equal ranges, each labeled with numbers and letters. Place a circle around the pain score.



0 = Feels good, no pain at all, no pain when moving.

1-3 = Slightly tolerable pain, no pain when staying still, slight pain when moving.

4-6 = Moderate pain, pain when still, pain when moving

7-10 = Severe pain, even when staying still.

The instrument used to collect this data has been checked for content validity, consistency of content, and appropriateness of language used. From three experts, the IOC value was calculated to be 0.85, and the content and language were considered and improved according to the experts' recommendations. The researcher took the assessment form that had passed the content validity check and tried it out with 30 office workers who work at the computer. Then, the data obtained were used to calculate the reliability coefficient, specifically Cronbach's Alpha. The result of the calculation of the reliability coefficient of Cronbach's Alpha Coefficient was equal to .84.

2. The experimental tools consisted of a health promotion manual for preventing office syndrome, which displayed pictures and methods for treating muscle aches and pains; a 5-minute video of a program for five exercises to prevent office syndrome; and a poster showing five exercises to prevent office syndrome. The content validity was examined by three experts: one occupational health nurse and two nursing instructors, and the content was revised according to their recommendations before being put into actual use.

The control group received health education on health promotion, prevention, and treatment of office syndrome symptoms, along with a health promotion and prevention manual for office syndrome, to care for their own health according to the guidelines outlined in the manual.

The experimental group received demonstration and practice of exercise methods according to the 5 exercise programs to prevent office syndrome, including: Postures of bending the neck, tilting the neck left and right, bending the arms, putting the hands together, and clasping the hands together, and being instructed on how to use the stopwatch device before starting work each day. Volunteers pressed the stopwatch device button before starting work. When the clock struck, the subjects got up and turned it off. The experimental group exercised according to the exercise program designed to prevent office syndrome, performing five postures six times a day, at 10:00, 11:00, 12:00, 14:00, 15:00, and 16:00 hours. Each time took 5 minutes, every day, Monday to Friday, for a period of 4 weeks, with a total of 30 exercises per week.

Data collection

Data was collected at initial enrollment into the study (0 week) and repeated at 4 weeks after the experiment. In the total sample of 112 individuals.

Data analysis and statistics method:

1. Personal data of the sample group was analyzed using descriptive statistics, including frequency distribution, percentage, mean, and standard deviation.
2. Compare the average pain levels of the neck, shoulders, and upper back muscles before and after the experiment using the Paired t-test statistics.
3. Compare the average of the difference before and after the pain level of the neck, shoulder, and upper back muscles, between the experimental group and the control group using the Independent t-test statistic.

Protection of rights and research ethics

The proposal was presented to the research committee of Boromarajonani College of Nursing, Saraburi, for ethical consideration and approval before proceeding. Ethics approval was received, EC 1-005/2023, on September 29, 2023. The research outlined the research objectives, methods, potential benefits, and risks, including muscle aches and work-related anxiety, as well as guidelines for taking breaks in the event of muscle pain during participation. The researcher has written a coordination letter to request permission from Participate's organization for the research experiment. Participants were informed, prior to signing the consent form, that they would be participating in the research. During the research, volunteers were able to cancel their participation.

Results

Table No. 1. Number and percentage of personal data of the sample group

Personal data characteristics	Control group (n = 56)		Experimental group (n = 56)	
	Quantity (person)	Percentage	Quantity (person)	Percentage
Sex				
Female	45	80.36	49	87.50
Male	11	19.64	7	12.50
Age				
20-30 years old	17	30.36	17	30.36
31-40 years old	16	28.57	17	30.36
41-50 years old	20	35.71	19	35.71
51-60 years old	3	5.36	3	5.36
Education level				
Secondary education	1	1.79	1	1.79
Vocational /Higher Vocational Certificate	12	21.43	9	16.07
Bachelor's degree	37	66.07	41	73.21
Higher than bachelor's degree	6	10.71	5	8.93
Job position				
Employee	51	91.07	49	87.50
Manager	5	8.93	7	12.50

The experimental and control groups consisted of 56 people each, with an equal number of participants in each group. Each group had similar characteristics, including gender, age, and the type of job participants performed. The control group consisted primarily of females, with 45 people, or 80.36 percent, and males, with 11 people, or 19.64 percent. Most were in the 41-50 age range, with 20 people, or 35.71 percent, followed by those aged 31-40, with 16 people, or 28.57 percent. All sample groups had work characteristics of sitting and working with computers for 4 hours or more per day. Most had positions. Operational level: 51 people, representing 91.07 percent; supervisor level: 5 people, representing 8.93 percent.

The majority of the experimental group consisted of 49 females, representing 87.50%, and seven males, representing 12.50%. Most of them were in the age range. 41-50 years old, 19 people, representing 35.71 %, followed by 31-40 years old, 17 people, representing 30.36%. All sample groups have work characteristics that involve sitting and working with computers daily. The duration is 4 hours or more, with the majority of positions at the Operational level (49 people, representing 87.50%) and the supervisor level (7 people, representing 12.50%).

Table No. 2: Comparison of the mean level of muscle pain in the neck, shoulders, and upper back before and after participating in the exercise program to prevent office syndrome in the control group (n = 56).

Pain level	Before entering the program		After entering the program (4-weeks)		t	p-value
	Mean	SD	Mean	SD		
Neck	4.929	2.271	4.196	2.467	1.841	.071
Shoulders	5.375	2.179	4.661	2.630	1.781	.080
Upper back	4.804	2.408	4.143	2.475	1.673	.100

*p-value < 0.05

In the control group, it was found that, prior to joining the program, the level of muscle pain in the neck and shoulders was moderate. After joining the program in the control group, it was found that pain in all areas (neck, shoulders, and upper back) was slightly reduced; however, there was no statistically significant difference (p > 0.05).

Table No. 3: Compares the mean level of muscle pain in the neck, shoulders, and upper back before and after participating in the exercise program aimed at preventing office syndrome in the experimental group (n = 56).

Pain level	Before entering the program		After entering the program (4-weeks)		t	p-value
	Mean	SD	Mean	SD		
Neck	3.607	2.513	2.768	2.573	1.909	.062
Shoulders	4.339	2.672	2.786	2.542	3.593	.001*
Upper back	3.411	2.613	2.554	2.522	1.934	.058

*p-value < 0.05

In the experimental group, it was found that before joining the program, the level of neck and upper back muscle pain was mild, and shoulder muscle pain was moderate. After joining the program, the experimental group found that shoulder pain was reduced, with a statistically significant decrease (p = 0.001). Meanwhile, neck and upper back pain also tended to decrease but did not reach a significant level (p = 0.062 and 0.058, respectively).

Table No. 4: Compare the mean of the difference before and after the level of muscle pain in the neck, shoulders, and upper back between the experimental group and the control group after joining the program. (4 weeks)

Pain level	Experimental group (n = 56)	Control group (n = 56)	t	p-value
	Mean Difference	Mean Difference		
Neck	0.839 ± -0.059	0.732 ± -0.196	.181	.857
Shoulders	1.554 ± 0.129	0.714 ± -0.452	1.423	.158
Upper back	0.857 ± 0.091	0.661 ± -0.067	.239	.812

*p-value < 0.05

Mean difference in back pain level after the program was higher in the experimental group than the control group in all positions, but when compared with the control group, no statistically significant difference was found (p > 0.05).

Discussions and Conclusion

This study found that the exercise program for preventing office syndrome tended to reduce muscle pain levels, especially in the shoulders, with a statistically significant difference between the before-and-after measurements in the experimental group (p = 0.001). Meanwhile, the neck and upper back showed improvement, although it did not reach statistical significance. This is because working with a computer continuously for more than 4 hours per day increases the risk of muscle fatigue, resulting in soreness. Changing appropriate work behaviors can help prevent office syndrome. A program of 5 exercises performed every hour during work exercises the neck, arm, and shoulder muscles, reducing muscle fatigue and soreness.

The experimental group had significantly reduced shoulder pain scores compared to the control group. Sitting and working at a computer in the same position continuously causes the shoulder muscles to tense, as the arms are stretched forward to hold the mouse or keyboard, resulting in the upper trapezius muscles being held in a tense position for an extended period. Performing exercises in posture 3, bending the arms to the side, posture 4, clasping the hands in front and pressing the hands down, and posture 5, clasping the hands behind the back and pulling the arms down, will help move the scapular muscles (Trapezius muscle). Together with volunteers who cooperate in the management practice, research by Boonruen S (2021)[19] found that adding 5 Maniwet exercise postures to Royal massage resulted in a significant reduction in shoulder muscle pain levels when compared to Royal massage alone.[19] An exercise program that includes improving flexibility, strength and balance in the office, five times a week every workday for six months. It helped reduce pain in multiple areas, including the shoulders, neck, and

back, with significant improvements in physical function, flexibility, and muscle strength ($p = 0.000$).[15]

The study results showed no difference in the locations of neck and upper back pain, possibly because the program's duration of only 1 month was insufficient. The frequency of exercise may not have been sufficient for the results in the neck and back locations. This finding is inconsistent with previous research, which has shown that exercise has a moderate effect in helping to prevent neck muscle pain in office workers.[16] The results of modifying ergonomic factors together with exercise for 12 weeks were significantly effective in helping to reduce neck muscle pain.[17] Performing five exercises, including neck-bending, neck-tilting, arm-bending, hands-in-hand, and hand-joining, every hour, six times a day, during four weeks, significantly reduced shoulder-shoulder muscle pain. This indicates that the five-exercise program and its frequency are appropriate for the shoulder muscles. However, this program has limitations as follows.

Limitations:

The duration, frequency, or follow-up of exercise may not be sufficient for alleviating neck and back muscle pain. The sample size may be insufficient, and adherence to the program may be a crucial variable if some participants do not adhere strictly to it. The outcome, measured as muscle pain, is a self-report and may be influenced by psychological factors or expectations.

Suggestion

1. The study and research period should be extended to more than 4 weeks in order to track changes in neck and back muscles.
2. Increase the sample size. To be able to confirm the performance in other positions clearly.
3. Adjust the program, adding exercises that are specific to the neck and back muscles.

In conclusion, an exercise program to prevent office syndrome, consisting of five physical exercises: neck-bending, neck-tilting, arm-bending, hands-in-hand, and hand-joining, performed every hour, six times a day, every workday, over a period of four weeks, can help reduce shoulder-shoulder muscle pain in workers who sit at a computer for more than four hours a day.

Acknowledgements : The researchers would like to thank all volunteers for their excellent cooperation .

References

1. Office of Health Promotion, Department of Health, Ministry of Public Health. Health promotion to "conquer office syndrome" in working age groups. Bangkok: Aekrim Studio Co., Ltd.; 2564. (in Thai)
2. Chaiklieng S, Krusun M. Health risk assessment and incidence of shoulder pain among office workers. Procedia Manufacturing 2 015; 3: 4941-4947. (in Thai)
3. Department of Health. (2022). Health trends of working-age people in Thailand in 2022. Published 2022. (Accessed on July 23, 2025 at https://www.anamai.moph.go.th) (in Thai)
4. Guan S, Zheng J, Zhang S, Xu S, Shuai Z, Cai H, Pan F. Global Burden of Musculoskeletal Disorders in Adults Aged 50 and Over , 1990–2021: Risk Factors and Sociodemographic Inequalities. JCS. 2025. (Accessed on July 20, 2025 at https://doi.org/10.1002/jcsm.70008)
5. Lucas J, Doorn PV, Hegedus E, Lewis J, Windt DV. A systematic review of the global prevalence and incidence of shoulder pain. BMC Public Health. 2022; 23:1073. (Accessed on July 23, 2025 at https://doi.org/10.1186/s12891-022-05973-8)
6. Putsa B, Jalayondeja W, Mekhora K, Bhuanantanondh P, Jalayondeja C. Factors associated with reduced risk of musculoskeletal disorders among office workers: a cross - sectional study 2017 to 2020. BMC Public Health (2022) 22:1503. (Accessed on July 21, 2025 at https://doi.org/10.1186/s12889-022-13940-0)
7. Yota W, Neubert MS, Kaewdok T. Occupational risk factors related to musculoskeletal disorders among Praewa silk weavers in the Northeast region, Thailand. Narra J 2025; 5 (1): e1480. (Accessed on July 21, 2025 at http://doi.org/10.52225/narra.v5i1.1480) (in Thai)
8. Phoonjaroen P, Utaiwattana N, Thawisuk C. Ergonomic Risks and Musculoskeletal Pain among Office Workers in a Healthcare Setting: A Cross- Sectional Study. SMJ 2025; 77(6): 446-455 (Accessed on July 21, 2025 at https://he02.tci-thaijo.org/index.php/sirirajmedj/index) (in Thai)
9. Alhazmi MH, Khired Z, Alhazmi MA, Zogel B, Darraj H, Hakami SM, Qahl SM, Hakami KM, Hadadi O, Mobarki OA. The Impact of Neck Pain on Work Productivity and Quality of Life Among Office Workers in Jazan: A Cross-Sectional Study. Cureus 2024; 16(12): e76254. (Accessed on July 21, 2025 at doi 10.7759/cureus.76254)
10. Gao W, Mattia Sanna M, Chen Y, Tsai M, Chi -PangWen. Occupational Sitting Time, Leisure Physical Activity, and All-Cause and Cardiovascular Disease Mortality. JAMA Network Open. 2024;7(1):e 2350680. (Accessed on July 22, 2025 at doi:10.1001/jamanetworkopen.2023.50680)
11. AlOmar RS, AlShamlan NA, Alawashiz S, Badawood Y, Ghwoidi BA. Abugad H. Musculoskeletal symptoms and their associated risk factors among Saudi office workers: a cross-sectional study.2021. BMC Musculoskeletal Disorders (Accessed on July 23, 2025 at https://doi.org/10.1186/s12891-021-04652-4)
12. Grabara, M. Prevalence of musculoskeletal disorders among Polish white-collar workers: the role of physical activity and risk factors. Frontiers in Public Health. 2025. (Accessed on July 21, 2025 at doi: 10.3389/fpubh.2025.1551728)
13. Goncharenko IM, Komleva NE, Chekhonatsky AA. Lower back pain at workplace: prevalence and risk factors.

Neurology. 2020; 9(2) 1-16. (Accessed on July 23, 2025 at doi: 10.15275/rusomj.2020.0207)

14. Akkarakittichoke N, Jensen MP, Newman A, Waongenngarm P, Janwantanakul P. Characteristics of office workers who benefit most from interventions for preventing neck and low back pain: a moderation analysis. Pain report. 2022 : 1-8 (Accessed on July 21, 2025 at www.painreportsonline.com) (in Thai)
15. Konstantina Karatrantou K, Gerodimos V. A comprehensive workplace exercise intervention to reduce musculoskeletal pain and improve functional capacity in office workers: A Randomized Controlled Study. Healthcare. 2024;12(915):1-26. (Accessed on July 23, 2025 at https://doi.org/10.3390/healthcare12090915) (in Thai)
16. Teichert F, Karner V, Doding R, Saueressig T, Owen PJ, Belavy DL. Effectiveness of exercise interventions

for preventing neck pain: A Systematic Review With Meta-analysis of Randomized Controlled Trials. J Orthop. Sports Phys. Ther. 2023; 56(10):594-609.

17. Johnston V, Chen BMC Musculoskeletal Disorders. 2021;22(68):1-12. (Accessed on July 23, 2025 at https://doi.org/10.1186/s12891-021-03945-y)
18. Leesiriwattanakul S, Charoenkit K, Phibanwong W. The effect of Thai massage program on office syndrome symptoms of personnel. J Nurses Minist Public Health. 2019 : 129-141. (in Thai)
19 . Bunruen S. The results of royal massage therapy combined with Maniwet exercises in patients with Office Syndrome, Don Tum Hospital, Nakhon Pathom Province. J Nur Edu 2021 ;14(1):91-105. (in Thai)
20. Srisuk W. Innovation of acupressure sticks to reduce pain. Presented at: Public Health Academic Conference, Health Region 2; March 24-25, 2021.
21. Yotyok M, Srichai F, Suksiri P. Waistcoat for rest. In: Proceedings of the 13th Hatyai National and International Conference; 2021:960-970.
22. Kang H. Sample size determination and power analysis using the G*Power software. J Educ Eval Health Prof 2021;18:17. (Accessed on July 25, 2025 at https://doi.org/10.3352/jeehp.2021.18.17)