FEATURE ARTICLE
Successful Program

Education of Garment Workers

Prevention of Work Related Musculoskeletal Disorders

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Occupational related diseases affect 15% to 20% of all Americans (Melhorn, 1996). Musculoskeletal disorders rank second to cardiovascular disease as a cause of disability in the United States (Sokas, 1989). One group with a high incidence of work related musculoskeletal disorders are workers in the garment industry, especially sewing machine operators (Andersen, 1993). This industry employs more than 1 million workers in the United States and millions more worldwide (Sokas, 1989). Many of the work related musculoskeletal disorders in this population are caused by a cumulative effect to the soft tissue structure. These "cumulative trauma disorders" account for 56% of all occupational injuries and illnesses in the United States (Melhorn, 1996).

In the United States, the apparel manufacturing industry accounts for approximately 40% of the industries with the highest reported incident and incidence rates from repetitive motion (Bureau of Labor Standards, 1994). The San Francisco Bay Area garment industry is currently the third largest in the country after New York and Los Angeles (Louie, 1992; Garment Industry Development Corporation, 2001). Most of the workers immigrated from China, Hong Kong, and Taiwan, with smaller numbers immigrating from Vietnam, Cambodia, the Philippines, Korea, Mexico, and Central America (Louie, 1992). In California, the garment industry employs approximately 160,000 workers; the majority of these workers are immigrant women (Asian Immigrant Women Advocates [AIWA], 1999; Punnett, 1985; Targeted Industries Partnership Program [TIPP], 1997).

Most experts agree that work related musculoskeletal disorders and other workplace injuries and illnesses are greatly underreported, undiagnosed, and untreated in this population (TIPP, 1997). Immigrant workers are also frequently afraid to report work related injuries and their workplace's poor compliance with occupational safety and health requirements. These violations are common in garment industry workplaces, which are also known as "sweatshops" (TIPP, 1997). The U.S. General Accounting Office (Sweatshop Watch, 1997a, 1997b) defines a sweatshop as

> an employer that violates more than one federal or state labor, industrial homework, occupational safety and health, workers' compensation, or industry registration law.

More specifically, previous studies (Andersen, 1993; Punnett, 1985; Schibye, 1995) have indicated garment workers often perform monotonous, highly repetitive, and high speed precision tasks requiring non-neutral and awkward joint postures. Many are paid by the piece rate system, which poses both stress related and musculoskeletal health risks (Plattus, 1998). These exposures place garment workers at risk for developing work relat-

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ed musculoskeletal disorders of the neck, shoulder, back, and upper and lower extremities. Another risk factor is poor posture, which is characterized by a sitting posture with the operator's head and trunk flexed forward (Li, 1995). These health risks may be mediated by training and performing ergonomic interventions, such as modifying the workstation, seat surface, seat height, work height, and seat back (Nag, 1992).

PURPOSE AND RATIONALE OF PROJECT

This article describes the development of a culturally relevant occupational health and safety educational program to reduce garment workers' musculoskeletal problems, specifically to increase perceived energy level after completing stretching exercises and to empower each garment worker to make at least one workplace ergonomic change. This educational program, the Healthy Worker Class, developed in part as a graduate occupational health nursing student rotation, was part of a multi pronged intervention that also included outreach, clinical care, and an ergonomic intervention designed and pilot tested by the garment workers. The educational program covered stretching exercises, ergonomics, and other information to assist garment workers in preventing and reducing work related musculoskeletal disorders. This education was provided within a culturally relevant, risk communication/empowerment framework, with the goal to promote individual and workplace change.

The garment workers in the Oakland, California Chinatown area are Asian immigrant women at high risk for work related musculoskeletal disorders with very limited access to health care and health insurance (AIWA, 1999). The majority will never enter the workers' compensation system because of fear of job loss. The Asian Immigrant Women Worker's Clinic (AIWWC) was funded primarily by the California Wellness Foundation. The clinic was in operation from April 2000 to December 2001 and provided free occupational health care to approximately 160 garment workers in the Oakland region. The AIWWC was a joint effort with a community nonprofit group (aimed to empower Asian immigrant women in the Bay Area) and the University of California San Francisco (UCSF), Division of Occupational and Environmental Medicine and the Occupational and Environmental Health Nursing program.

The clinic was created to provide medical assessment, treatment, and prevention for various work related diseases and illnesses, with musculoskeletal problems as the major focus, at no cost to these workers (AIWA, 1999). As part of the treatment and prevention program, AIWWC patients were referred to the Healthy Worker stretching and ergonomic classes held at the office of this community nonprofit group.

CHINESE HEALTH BELIEFS

Because the majority of these female garment workers were new immigrants and had traditional Chinese values, it is important to discuss some of the basis and foundation of their beliefs in life and health. Taoism, Confucianism, and Buddhism are three philosophies and religions that strongly influence the Chinese way of life, including beliefs and behaviors about health and illness (Chen, 1996).

The Taoism theory of yin and yang dominates the concepts of health and illness in traditional Chinese thought. In Chinese medicine, health is viewed as the harmony between the forces of yin and yang within and between the body and the environment. Illness is viewed as an imbalance of these forces (Chen, 1996). Beinfield (1991) describes yin and yang as a "unified whole characterized in relation to each other, revolving cycles of the 'one' becoming the 'other.'" For example, the sun is bigger, brighter, and hotter (yang) in relation to the earth, which is smaller, darker, and cooler (yin). Yin and yang cannot be separated (Beinfield, 1991).

The next concept of qi (or chi) is formulated by yin and yang. Qi is called the "vital energy" in the Western world. Qi is the "source of life" and is "the energy circulating in the human body" (Chen, 1996). The study of human qi relates to health and longevity. The traditional Chinese physician focuses on the interruption or blockage of qi, which is the driving force of human life. This system forms the basis for the diagnosis and treatment of illness, as well as for promoting health and preventing illness (Chen, 1996).

One common treatment modality in Western medicine is the use of ice. However, the traditional Chinese physician and this philosophy do not encourage the use of ice. The nature of cold slows things down by chilling them, which depresses metabolism and retards circulation (Beinfield, 1991). Cold arises externally, as well as internally by ingesting an excess of food, liquid, or medicine. Because antibiotic and aspirin have the ability to counteract inflammation and fever, they consider them to be "cold" in nature (Beinfield, 1991). This is why many Asian immigrant women are resistant to Western medicine and the use of ice.

The educational Healthy Worker Classes integrated the concepts of yin and yang with the Western medicine practice of treating pain. The classes included stretching exercises, ergonomics, and other injury prevention information. For the purpose of this article, the Healthy Worker Class objectives and plans are discussed with the measurable outcomes for classes held between February 2001 and April 2001.

CLASS OVERVIEW

Population

The clinic population consisted primarily of female immigrant workers from Mainland China, Hong Kong, and Taiwan, with some from Vietnam of Chinese descent. The majority were non-English speaking immigrants with an average age of 45. Most were working or had recently worked in the garment industry, and the majority had no health insurance, with a few sharing their spouse's medical insurance. Furthermore, most of the workers had an income below the poverty level and limited job opportunities (Lashuay, 2002). All were diagnosed with work related musculoskeletal disorders involving both the upper and lower extremities.

Useful Information

Risk Factors for Injury

- Sitting more than 8 hours per day.
- Increased compression on the spine.
- Repetitive motion.
- Repetitive twisting.
- Incorrect physical posture.
- Poor muscle tone, decreased flexibility, obesity.
- More than two term pregnancies.

Warning Signs of Injury

- Pain.
- Numbness and tingling.
- Weakness.
- Swelling.

Anti Inflammatory Medications

- Ibuprofen (generic name) vs. Motrin, Advil (brand name).

Ice and Heat

- Ice decreases inflammation and "heat" that cause the pain.

Setting

The educational classes were held at the offices of the nonprofit women's community group in Oakland's Chinatown community. The facility was easily accessible by public transportation. The Healthy Worker Classes were a two-part series, held the first and third Wednesday nights of every month, for approximately 90 to 120 minutes for each class. Upper extremities were the focus in the first class, and the lower extremities were the focus in the second class. The classes and the clinics were held in the evening so the clients could come after work, with dinner provided. All content was simultaneously translated into Cantonese. The classes were co-taught by a Cantonese speaking ergonomics specialist and an occupational health nursing graduate student with faculty supervision.

Learning Objectives

The learning objectives for the Healthy Worker Class were for participants to be able to:

- Define risk factors for musculoskeletal injuries.
- Understand the use of anti inflammatory medications and ice therapy.
- Correctly demonstrate upper and lower extremities stretching exercises.
- Benefit from stretching exercises by having "stronger energy" or less pain at the end of each class.
- Implement the stretching exercises into their daily routine.
- Contract to make at least one ergonomic change at work.

Healthy Worker Class Curriculum

The class was conducted in a fairly informal environment with a semi structured schedule. A body map of a woman was set up, and participants were asked to mark their pain areas with colored stickers at the beginning of each class. Women were asked to subjectively rate their energy level (i.e., very weak, weak, normal, strong, very strong) before class by answering the question, "What is your energy level right now?"

In a brief introduction using risk communication guidelines to focus on those risk factors the individual can control, the goal was explained to keep women safe from injury so they will be well enough to take care of their families. Tui-Na exercises, which use methods of oscillating, pressure, friction, and passive joint movement, were conducted as a fun exercise. These exercises served as a culturally relevant warm up and an icebreaker.

Risk factors for injuries and the rationale for anti inflammatory medications and ice therapy were content areas presented in an interactive format, within the framework of yin and yang, using questions pooled by the teachers. The benefit of stretch exercises for prevention of injury and strengthening was discussed. Participants also were given a handout, written in both Chinese and English, outlining the information that was discussed (see Sidebar).

Prior to demonstrations of the specific stretch exercises, photo overheads of specific sewing task related risk factors were presented and linked to the symptomatic body parts identified on the body map. Other concepts emphasized were the importance of neutral postures and the frequency of performing these exercises, stressing the importance of stretching for both injury prevention and injury rehabilitation. Throughout the class, each stretch exercise was demonstrated by the instructor and the participants.

At the end of each class, easy ergonomic interventions were demonstrated, for example, using foam to pad the seat pan of the metal chairs commonly found in the worksites and using foam for the lumbar support. In an effort to encourage the women to make appropriate changes as a result of this class, two Chinese garment women workers provided a 5 to 10 minute testimonial in Cantonese via video to share their "successful" stories after attending the Healthy Worker Class. The women rated their self perception of energy again after each class (i.e., very weak, weak, normal, strong, very strong) by answering the same question asked at the beginning of the class, "What is your energy level right now?"

A contract written in Chinese and English (see Figure) for an ergonomic/stretching commitment was presented during the first class. Success of the program and barriers to change were discussed during the second class. Again, using interactive teaching strategies and group problem solving, creative solutions were generated by the group on how best to integrate exercise into busy lives and how best to discuss ergonomic changes with supervisors. After com-

Table

Healthy Worker Class Evaluation Results

	Very Weak (1)	*Weak (2)*	*Normal Energy (3)*	*Strong (4)*	*Very Strong (5)*	*Mean*
February						
Class 1 (*N* = 8)						
Before	0	3	4	1	0	2.75
After	0	0	3	5	0	3.63
Class 2 (*N* = 7)						
Before	0	3	3	1	0	2.71
After	0	0	5	2	0	3.29
March						
Class 1 (*N* = 7)						
Before	1	3	3	0	0	2.29
After	0	3	4	0	0	2.57
Class 2 (*N* = 9)						
Before	0	5	4	0	0	2.44
After	0	1	8	0	0	2.89
April						
Class 1 (*N* = 4)						
Before	0	4	0	0	0	2.00
After	0	0	4	0	0	3.00
Class 2 (*N* = 4)						
Before	0	4	0	0	0	2.00
After	0	1	3	0	0	2.75

pletion of the two-part series, each woman received enough foam to pad her seat pan and create lumbar supports. In addition, each woman was given a handout describing stretching exercises that was translated into Chinese.

All of the handouts, questionnaires, and contracts were written in both Chinese and English so the participants could read and understand the information and review them on their own at home. Prior to use, the materials were tested for language clarity and reading level to ensure suitability for this population.

RESULTS

A total of 21 women participated in the class with completed energy questionnaires. Class size varied from

Healthy Worker Class Contract

Name:______________________ Date:______________________

I promise to myself, during the next week, to make the following two changes:

1) Work environment safety change, I will:

____

____

2) To pick one stretch exercise and perform it twice a day.

Signature:______________________

Figure. Asian Immigrant Woman Worker Clinic's contract for the Healthy Worker Class.

IN SUMMARY

Education of Garment Workers

Prevention of Work Related Musculoskeletal Disorders

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1. Garment workers have a high incidence of work related musculoskeletal disorders, but their injuries and illnesses are greatly underreported, undiagnosed, and untreated. The majority of garment workers are immigrants, who are frequently afraid to report work related injuries.

2. This article describes the development and objectives of a program to provide culturally relevant occupational health and safety education to reduce garment workers' musculoskeletal problems.

3. The Healthy Worker Class was designed as a culturally sensitive program to reduce musculoskeletal complaints among garment workers. Because the majority of the garment workers were female immigrants from China and had traditional Chinese values, these aspects were incorporated into the class curriculm.

4. Future goals for this program are to train garment workers as leaders who would then use this prevention based curriculum to teach small groups of additional garment workers.

four to nine participants, with very little attrition between the first and second class. All classes were interactive and engaged all participants in active demonstration of the stretching exercises. No formal evaluation of knowledge acquisition was performed because of time and language issues, and a pretest-posttest measurement may be considered for future educational programs.

The basis of traditional Chinese medicine in human life is a balance of forces or energy, yin and yang. Therefore, the level of participants' energy may be a measurable outcome if they feel energized, refreshed, or relaxed after each class. Before and after results for participants were evaluated after each class with a questionnaire. The questionnaire used a Likert scale with five choices: very weak, weak, normal energy, strong, and very strong. The questionnaire also was pretested by a few native speakers for clarity and the appropriate reading level for this population prior to use.

Results from the February, March, and April classes (see Table) were collated by class, and mean energy levels were calculated for the six classes. The five energy levels were given a numeric value for calculation: very weak, 1; weak, 2; normal energy, 3; strong, 4; and very strong, 5. For the six classes, mean energy levels at the beginning of each class ranged from 2.00 to 2.75. Mean energy levels at the end of each class ranged from 2.57 to 3.36. These results showed that on average, participants perceived they had an increased energy level at the end of each class.

At the end of the first class, each participant was asked to complete a personal commitment contract form (see Figure) to make two changes – one stretch exercise and one ergonomic change. At the beginning of the second class, a short discussion was held about whether each participant was able to make the changes, barriers they faced, and any other questions they might have had. Although these data were not formally collected, it was observed that stretch exercises were easier to accomplish for the garment workers. Reported barriers to institute any ergonomic changes included intimidation at drawing attention to themselves and fear of supervisor retaliation for reporting symptoms.

PLAN FOR CONTINUATION AND RECOMMENDATIONS

The ultimate goal of the Healthy Worker Class was to reach more garment workers with this prevention based curriculum, using garment worker leaders as trainers. Each garment worker leader would train an additional 10 garment workers in respective small sewing shops. The current evaluation methods were limited to short term results only. It would be valuable to evaluate the maintenance of stretching exercises and sustaining of any workplace ergonomic change as a result of the Healthy Worker Class after 6 to 12 months. Work related musculoskeletal disorder symptoms and function surveys also could be evaluated over time. The use of contingency contracting with this population of monolingual Cantonese women needs further study.

SUMMARY

This educational intervention was designed as part of a garment worker occupational health and safety initiative, with the goal to reduce musculoskeletal symptoms in this monolingual Cantonese speaking population. Using risk communication and the Chinese concepts of yin and yang, the class curriculum was designed to be participatory. It focused on linking symptoms to high risk work activities; explaining the nature of musculoskeletal injury; and encouraging compliance with self care measures of ice, stretching, and early symptom reporting.

A total of 21 women completed the Healthy Work Classes, with an increase in perceived levels of energy measured after each class. Additionally, contingency contracting for both individual and workplace change was piloted. This curriculum was revised to become a "train the trainer" program, with training of garment worker leaders and the goal to disseminate this prevention based curriculum to garment workers in the Oakland, California community.

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