

among nursing personnel was 19% to 22% for shoulder or upper arm, 2% to 3% for elbow or forearm, 6% for wrist or hand, 7% to 9% for hip or upper leg, 10% to 13% for knee or lower leg, and 3% to 4% for ankle or foot.²²⁻²³ The prevalence of musculoskeletal discomfort in health-care workers other than nurses and nursing aides has also been less frequently studied but appeared to be high. Feinstein found that the life prevalence of musculoskeletal complaints was 54% among laboratory technicians, and 68% among x-ray technicians.²⁴ In another study by Bassett, dental practitioners reported the life prevalence of musculoskeletal complaints to be 62%.²⁵ By body part, 20% to 54% of dentists had upper back problems,²⁶⁻³⁰ and 7% to 23% had shoulder problems.^{27,30}

Musculoskeletal discomfort may cause huge economic losses, including medical costs and loss of productivity. In the United States, back pain alone is the second most common reason for sick leaves and accounts for about 40% of absences from work;³¹ more than 100 million workdays were lost due to back pain in 1988.⁷ The direct compensation costs for back pain were more than US \$1 billion in 1979,³ and US \$50 to \$100 billion in 1990.⁶ In addition, many workers recalled having stopped working or changed jobs due to back pain.^{5,7,33} Back pain has also caused large numbers of lost workdays and huge amounts of costs in many other countries.^{15,23,33-34} If all musculoskeletal conditions are taken into account, lost workdays and productivity would be even much greater.²³ Health-care workers are no exception. Behar et al. found that musculoskeletal disorders were a main cause of sick leave among female hospital workers, and that 28% of those who took sick leave due to musculoskeletal problems required medical treatment.¹⁹

Although many studies have been conducted on back pain among nursing staff,¹ other musculoskeletal conditions and musculoskeletal problems among other health-care workers have been less extensively studied. Likewise, most studies have been focused on pain, although musculoskeletal conditions of other nature, such as soreness and numbness, may also affect work performance and result in loss of workdays and reduced productivity. To assess the prevalence of musculoskeletal discomforts of different body parts

among various health-care workers, we conducted a survey in a medical center in southern Taiwan. Limitation of motion was used as an indicator of job interference by the musculoskeletal condition and thus an indicator of the severity of the condition. We also asked the participants to evaluate the association between the musculoskeletal conditions and their jobs as health-care workers. In addition, we asked them to recall changes in job status and loss of workdays due to those conditions.

MATERIALS AND METHODS

An 857-bed medical center in southern Taiwan was selected as the site of investigation. All full-time employees except administrative personnel were invited to participate in a questionnaire survey. They were identified from the personnel records of the hospital. According to their job titles, the qualified workers were grouped into the following 4 job categories: doctors, which included full-time and in-training doctors and dentists; nursing staff, which included full-time and in-training nurses; medical technicians, which included laboratory workers, medical imaging technicians, rehabilitation staff, and radio-therapy technicians; and support staff, which included mechanics, janitors, cleaners, kitchen staff, laundry room staff, and supply staff. Each qualified employee was asked to fill out a standard questionnaire which was disseminated by the section chiefs. Participants were given 1 week to fill out the questionnaire. Section chiefs then collected the questionnaires and made sure that no worker failed to return the questionnaire because of sick leave. The questionnaire included a series of questions on musculoskeletal complaints and began with the question "Since entering this occupation, have you suffered from musculoskeletal discomforts such as pain, numbness, or limitation of motion? [yes or no]" If the answer was "yes," the participant was asked to identify the nature of the condition (pain, soreness, numbness, or limit of motion; multiple choices were allowed) and, for each condition, the body parts involved (neck, shoulder, upper back, elbow, lower back, wrist, hand, hip, upper leg, knee, lower leg, ankle, or others; multi-