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The prevalence of and risk factors for work-related back problems among home care nursing personnel in Hong Kong

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THE PREVALENCE OF AND RISK FACTORS FOR WORK-RELATED BACK PROBLEMS AMONG HOME CARE NURSING PERSONNEL IN HONG KONG

by

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DISSERTATION

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DEDICATION

To my parents, husband, and two lovely daughters,
Who gave me the love, support, and encouragement to finish this study
and fulfill my dream
This is the greatest gift that I have ever had

Especially to my daughters, Tivona and Simcha:

Learning is a life-long process
Love each other
Share joy and pain
Construct your meaningful life journey

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ABSTRACT

THE PREVALENCE OF AND RISK FACTORS FOR WORK-RELATED BACK PROBLEMS AMONG COMMUNITY NURSING PERSONNEL IN HONG KONG

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University of California, San Francisco, 2004

Background: Nursing personnel are well-known internationally for having more work-related back problems (WRBPs) than those in other occupations. However, back problems among home care nursing personnel (HCNP) have not been well studied.

Objectives: The goal of the study was to describe the prevalence of and risk factors for WRBPs among HCNP in Hong Kong (HK).

Method: A total population sampling technique was employed in this cross-sectional retrospective questionnaire-based study. The questionnaire, which consisted of five sections, was distributed to all HCNP working under the Hospital Authority of HK from June to September 2003.

Results: Of the 491 questionnaires that were distributed, a total of 406 were returned, for a response rate of 82.7%. The 12-month prevalence of back pain was 70.5% ($\underline{n}$ = 284). Among those who reported experiencing back pain, 89.1% ($\underline{n}$ = 245) believed that their pain was caused or aggravated by work, for a 12-month prevalence of work-related back pain of 62.2% ($\underline{n}$ = 245). Three predictors for work-related back pain were identified using multiple logistic regression analyses that controlled for potentially confounding variables: physical risk factors in the office (OR = 2.49, 95% CI = 1.17 – 5.27), static postures (OR = 1.45, 95% CI = 1.09 – 1.93), and psychological job demands (OR = 1.13, 95% CI = 1.03 – 1.24).

Conclusion: The results of the study confirm a high prevalence of WRBPs among HCNP in HK with a concomitant need to reduce back problems among this population. Since this study provides an introductory evaluation of the problem, an in-depth risk assessment of each risk factor identified is necessary before intervention programs can be implemented. In addition, managers and HCNP should be aware that the physical workload commonly encountered in home care work is not the sole risk factor for back problems; the important role of psychosocial factors and office work in this population cannot be ignored. Lastly, administrative, as well as support from patients when feasible, are essential elements in determining the success of back injury prevention programs.

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CHAPTER ONE

THE STUDY PROBLEM

Introduction

It is generally believed that back problems in human beings have existed since early times. In ancient Egypt, physicians used leg-moving exercises to diagnose sciatica and related sciatica to vertebral problems. In 1700, Bernardino Ramazzini, an Italian physician, known as the father of occupational medicine, "examined the harmful effects of unusual physical activity, such as sciatica caused by constantly turning the potter's wheel, lumbago from sitting, and hernias among porters and bearers of heavy loads" (Snook, Fine, & Silverstein, 1988, p.346). In addition to being one of the oldest occupational health problems, back pain and back injury continue to be one of the most common work-related problems even today. It is generally agreed that up to 80% of all people will experience low back problems at some stage in their active working life (Andersson, Fine, & Silverstein, 2000; Hoaglund & Byl, 1997). Back pain is the most common cause of disability for persons under age 45, the second most common reason for physician visits, and the third ranking reason for surgical procedures (Andersson et al., 2000; Hoaglund & Byl, 1997). Low back problems are costly as well. They are responsible for 34% to 40% of the total costs in workers' compensation claims. More than $16 billion in direct costs and $50 to $80 billion in indirect costs are spent each year on treating low back problems in the United States (Andersson et al., 2000).

Nursing personnel, including nursing aides, licensed practical nurses and registered nurses, are well known internationally to have more work-related back problems (WRBPs) than those in other occupations. In his review of the literature, Jensen (1987) found that in Israel, nursing personnel ranked second in terms of back pain prevalence after workers in heavy industry. In the United Kingdom, both male and female nursing personnel had higher lifetime prevalence of low back pain than teachers. In Denmark, nursing personnel, as well as fork-lift-truck drivers, reported the highest point and period prevalence of low back trouble. In his own study, Jensen (1987) reviewed data from four workers' compensation agencies from Idaho, North Carolina, New York, and Wisconsin. Rankings of 24 occupations, based on incidence rates of back sprains and strains, showed that nursing aides ranked first, construction laborers second, garbage collectors third, licensed practical nurses fourth, and registered nurses sixth (Jensen, 1987). Summarizing findings from nine published studies conducted in Finland, Israel, New Zealand, Sweden, the United Kingdom, and the United States over 15 years, Buckle (1987) claimed that back pain among nursing personnel has a world-wide lifetime prevalence of 35-80%, an annual (period) prevalence of 40-50%, a point prevalence of 17%, and an annual incidence of 7.7%. In 1996, Hignett reviewed more than 80 published studies over three decades confirming Buckle's findings. Owing to the high incidence and prevalence of back problems, WRBPs in nursing have attracted the deserved attention of many researchers.

Statement of Problem: Back Pain among Nursing Staff

In the past ten years, the demand of home care services has increased dramatically owing to the aging population and shorter length of hospital stay. Bureau of Labor Statistics (BLS) projections demonstrate that the number of home health care workers will increase by 56% over the ten-year period 2002-2012, making it one of the fastest growing U.S. employment sectors (U.S. Department of Labor, 1997; U.S. Department of

Labor, 2004). This accelerating demand for home care services is not only happening in the United States, but also internationally, including in Hong Kong (HK). This shift in care could be welcome news for patients, especially for those who prefer to receive care in their own homes. However, ergonomically unfavorable conditions in patients' homes could potentially increase the risk of WRBPs among HCNP.

In the U.S., the injury rate in home health care services, 474 lost-work day cases per 10,000 workers, is 50% higher than the injury rate among hospital workers, and 70% greater than for the general work force (U.S. Department of Labor, 1997). Among those injuries, overexertion while handling clients, is overwhelmingly the primary way in which home health care workers are injured (U.S. Department of Labor, 1996). A research-based study also show that home health care workers have a higher low back injury rate (15.4 per 100 full-time equivalent staff) than their counterparts in hospital work (5.9 per 100 full-time equivalent staff) (Myers, Jensen, Nestor & Rattiner, 1993). Research findings from other parts of the world consistently show high injury rates as well. For instance, in Sweden, the annual incidence of injury from overexertion accidents and musculoskeletal diseases is 19.2 and 15.1 per 1,000 workers, respectively, a higher rate than for those who work in nursery schools and employed women in general (Ono, Lagerstrom, Hagberg, Linden & Malker, 1995). In Demark, Hannerz and Tuchsen (2002), in their analysis of data from the Occupational Hospitalization Register, found that female home-helpers had a significantly higher age-standardized hospitalization ratio with regard to musculoskeletal disorders and injures such as back injury.

Besides personal loss, back problems are also costly. Meyer and Muntaner (1999) evaluated workers' compensation claims in West Virginia, and found that HCNP had a much higher number of days lost from work (mean [M] = 44 days, standard deviation [SD] = 106), indemnity payments (M = $1,523, SD = $3,729) and medical payments (M = $1,276, SD = $3,330) for overall occupational injuries and illnesses than those who worked in nursing homes and hospitals. Low back injuries accounted for the greatest proportion (36%) of these overall injuries and, most significantly, the mean number of days lost from work due to low back injuries (60 days), the mean indemnity payments ($2,054), and the mean medical payments ($1,652) were much higher than those from overall injuries. These figures clearly demonstrate that WRBPs in home care are very costly to employers as well as to employees.

In one study, back pain was identified as one of the reasons that nursing personnel permanently leave this profession (Stubbs, Buckle, Hudson, Rivers, & Baty, 1986). In home care, when nursing personnel have WRBPs, not only do the employer and the injured workers lose, but the patients also lose. When home care personnel are injured, "Patients will have to start over to build a relationship with a new care provider and may experience great anxiety in the adjustment" (Janizewski & Caley, 1995, p. 54). Hence, the quality of patient care in home care could suffer more seriously from WRBPs among nursing personnel than care in institutional settings.

Results of an extensive review of literature indicate that there is a large gap in research in the area of WRBPs among HCNP - only about 33 studies have been conducted worldwide in countries, such as in the United States, Britain, Canada, the Netherlands, and Sweden. In 1988, in their annotated bibliography reviewing research on low-back injuries among nursing personnel, Jensen and colleagues identified that WRBPs in the home care field had been ignored by researchers. Sixteen years later, knowledge about the risk profile for WRBPs among HCNP is still unclear. The review of literature indicated that only 7 of the 33 research studies were about prevalence of and risk factors for WRBPs. Comparison of these studies is difficult because they differ in the following ways: (1) methodology (self-reported questionnaire vs. injury records); (2) definition of the problem (back pain vs. back injury); (3) location of the back problem (low back vs. entire back); (4) country of study (the United States, the Netherlands, and Canada); and (5) measure of the problem (lifetime prevalence, annual prevalence, and/or annual incidence). Nevertheless, one can conclude that WRBPs among HCNP are potentially more serious and costly than those seen in institutional settings. Therefore, more epidemiological studies should be conducted, especially in those countries where the practice of home care may differ from other countries, and more specifically to identify unique risk factors for WRBPs in home care personnel. For instance in HK, HCNP might face unique risk factors as compared to their counterparts in Western countries because they work in small apartments, walk rather than drive as a means of transportation, and lack assistance from nursing aides. If specific risk factors can be identified, appropriate intervention studies can then be developed to address these unique work situations.

Purpose of Study

The overall goal of this study is to describe the prevalence of and risk factors for WRBPs among HCNP in HK. Since no related studies in HK or the Republic of China have been conducted, this proposed study will make a contribution toward addressing this knowledge gap. The specific aims of the study are to describe the prevalence of WRBPs, risk factors for WRBPs, and functional outcomes of WRBPs among HCNP in HK. The hypotheses of the study are as follows:

(1) There is a high prevalence of back pain and work-related back pain among HCNP in HK;

(2) The contributing factors for back pain and work-related back pain are physical, psychosocial, personal and domestic work;

(3) Back pain will affect HCNP's work and personal daily life; and

(4) There are differences among HCNP (RNs versus ENs and CNS versus CPNS) with regard to the prevalence of and risk factors for back pain.

Definition of Terms

(1) Back: divided into two parts: upper back and lower back. Since the target population is nurses, the cutoff point for upper and lower back is not defined in the study. It is based on the assumption that nurses with proper training should have a similar perception regarding the location of the upper and lower back.

(2) Back pain: self defined aching sensation in either the upper or lower back regions.

(3) Work-related back pain: back pain that the HCNP perceived as being caused or aggravated by their paid home care job.

Significance of the Problem in Hong Kong

Hong Kong nursing personnel are not exempt from WRBPs, and the prevalence of back pain among nurses is much higher than the general population in the region. A telephone survey using a random sample of households (n = 1,305) of all districts in HK was conducted between January and August 1977 to determine the prevalence of low back pain among this population (Leung, 1999). The researcher found a cumulative lifetime prevalence of 57% (female respondents = 65%; and male respondents = 48%), an annual (period) prevalence of 44%, and a point prevalence of 7.4% (Leung, 1999).

In addition, three studies have been conducted in HK that investigated WRBPs among hospital nursing personnel (See Appendix A). Results of the studies indicated that the lifetime prevalence of back pain (n = 659) among nursing personnel was 70%, the 12-month prevalence was 40.5% (Yip, 2001), and the 3-month prevalence was 29% (Ho, Au-Yeung, Au, Huang, & Ko, 1997). The prevalence of back pain among RNs (n = 47) during their nursing career was 81% (French, Lee, Liu, Luk, & Wong, 1997). The lifetime prevalence among HK nursing personnel (70-81%) was higher than that in the general population in HK (57%), and even higher than their counterparts in the other countries, such as 60% in the United Kingdom (Smedley, Egger, Cooper, & Coggon, 1995), 78% in Taiwan (Chiou, Wong, & Lee, 1994), and 30-80% in a world-wide comparison study (Buckle, 1987).

The result of these three cross-sectional studies also illustrated that nursing personnel in HK are not different from their colleagues in the other countries with regard to WRBPs. Nurses in HK face a high risk of WRBPs and they also have been socialized into believing that WRBPs are part of their work. The results of a study conducted in one hospital by French and his colleagues (1997) indicated that 92% of the RNs had never reported their back pain to their employers (French et al., 1997). Moreover, HK home care nurses are exposed to similar risk factors for the WRBPs as compared to their counterparts in the other countries. The results indicated that lifting and transferring patients, stooping, less working experience, and shortage of staff were the major risk factors (French et al., 1997; Ho et al., 1997; Yip, 2001). The consequence of these

WRBPs is likely to be costly to both injured workers and their employers. The total time loss due to WRBPs was 528 working days (i.e., 1.1% nursing work force) in three months (Ho et al., 1997).

The accelerating demand for home care services is not only occurring in the United States, but also internationally, including in HK. The number of home visits for home care nurses in HK increased from approximately 220,000 in 1989-90 to 450,000 in 1997-98 (Hospital Authority, 1999), an approximately 13% annual increase. However, only 270 nurses (including ward managers, nursing officers, nursing specialists, registered nurses and enrolled nurses) worked in the home care setting in 1997-98 (Hospital Authority, 1999). In 2000, approximately 400 HCNP were working in HK (Chung, Chow, Chu, Kong, & Lam, 2000). During the time period 1997 to 2000, the average annual increase in manpower was about seven percent. These calculations illustrate that the increase in manpower may not be enough to meet the demands of home care services in HK, a city of about six million people. Due to the aging population there and concomitant shorter hospital stays, it is expected that an increasing number of patients will need home care services.

Home care nursing personnel work in HK in 32 community nursing centers under the jurisdiction of 11 hospitals. Two major services are provided by HCNP in HK. One is community nursing services (CNS) which provide nursing care and treatment for patients in their homes. Another service is community psychiatric nursing services (CPNS) which mainly provide psychological counseling and crisis intervention to patients. The ultimate goal of these two services is to provide "continuous care for patients who are discharged from hospitals and allow patients to recover in their home environment" (Hospital Authority, 2004a, 2004b). No nursing aides or personal attendants are employed in home care at this moment but this will occur in the near future (Mr. Tong, manager in nursing section of Hospital Authority, personal communication, December 15, 2000). The majority of HCNP are RNs and enrolled nurses (ENs). They both provide nursing care to patients but RNs are employed in more managerial or supervisory jobs than ENs are. The work of both types of nurses could be classified as outreach (i.e., those duties involving nursing care in patients' homes), and management duties (i.e., those duties involving paper work in the offices). In a cross-sectional study of 325 HCNP, Chung and colleagues (2000) found that about 90% ($\underline{n}$ = 219, response rate = 76%) of HCNP perform outreach duties for more than four hours a day (i.e., 77% of them worked 4 to 6 hours; and 13% worked more than 6 hours per day in patients' homes).

Home care nursing personnel in HK may face similar risk factors for WRBPs as those who work in other countries. Hong Kong HCNP, like their colleagues in other countries, work in uncertain working environments where they provide services such as "physical, mental and social care of the sick as well as physically handicapped people at home" (The College of Nursing, 1997). For this work, they need to carry a bag of equipment so that they have sufficient medical supplies while providing care to patients. In a study by Chung et al., the majority of the HCNP (95%, $\underline{n}$ = 242) had an instrument bag weighing more than 2 kg; and half of them ($\underline{n}$ = 122) had a bag that weighed more than 5 kg (Chung et al., 2000). Besides carrying a consistently heavy bag, HCNP are required to lift and turn patients. More than half of the HCNP (57%, $\underline{n}$ = 139) needed to lift or carry more than 10 kg in their daily work; and 21% ($\underline{n}$ = 50) lifted or carried more than 40 kg (Chung et al., 2000). Besides providing general nursing care such as wound care, catheter care, and drug administration, HCNP also assist patients in their daily activities and perform non-nursing duties, such as clerical work, accounting, and domestic work (Hospital Authority, 1996). Home care nursing personnel are also concerned about their own working conditions, for example increasing workload without the necessary supports such as manpower and supporting systems (Hospital Authority, 1996).

The prevalence of WRBPs among HCNP in HK is not known. Although no study has been conducted to describe the magnitude of and risk factors for WRBPs among HCNP in HK, the prevalence of knee pain among the same target population can provide some insight into the problem. The annual prevalence of knee pain among HCNP in HK was determined to be 65% (n = 158) (Chung et al., 2000). In the Netherlands, Knibbe and Friele (1996) found that the prevalence of back pain (67%, n = 238) among HCNP was much higher than that of knee pain (18%, n = 64). Reviewing a workers' compensation database in the United States, Meyer and Muntaner (1999) also found that the number of back injuries (36%, n = 138) was much higher than that of knee injuries (5%, n = 19). These two studies suggest that the prevalence of WRBPs among HCNP could be three to seven times higher than that of knee problems. These comparisons suggest that the level of WRBPs among HCNP in HK could be very serious indeed.

Besides having more WRBPs, HK HCNP might be exposed to some unusual risk factors for WRBPs. Working conditions for HCNP in HK are unique in at least one way since most HCNP walk rather than drive from one patient's home to another. In the Chung study (2000), the majority of HCNP (66%, n = 161) walked more than an hour per shift and 28% (n = 67) walked more than two hours, all the while most probably carrying a heavy bag. These activities might also have involved walking up and down stairs since some buildings are not equipped with elevators. Almost half of the HCNP (48%, n = 117) had to walk up stairs more than 30 minutes a day. Chung and colleagues (2000) found that walking up stairs 30 to 45 minutes a day was a risk factor for knee pain (OR = 5.20, 95% CI = 1.68-16.11). Walking or walking up stairs with a heavy instrument bag could also prove to be an unexpected risk factor for WRBPs in HK.

Adding to these problems, residential living spaces are much smaller than in Western countries, possibly putting HCNP in HK at greater risk for WRBPs. Most of the patients who need home care services live in public housing estates and some live alone without any long term caregivers (Hospital Authority, 1996). Living spaces in public estates are very small, ranging in size from 16 to 69.9 square meters. The housing for senior citizens ranges from 9 to 28 square meters (Census and Statistics Department, 2003). Usually, a family of four or more will live in an apartment where the bedrooms and bathrooms are also small. Hence, HCNP regularly provide nursing care in very limited spaces and without assistance.

Based on the various reasons mentioned above, HK HCNP might face three unique risk factors (i.e., walking, carrying a heavy nursing bag, and small working spaces) for WRBPs as compared to their colleagues in other countries. Thus, there is a need to identify the magnitude of and risk factors for WRBPs that are unique to HK HCNP. Only when HCNP know how to take care of their own health at work can they fully deliver total quality patient care. It is anticipated that the findings of this study will increase the awareness of managers, and staff nurses of WRBPs among HCNP. The results can also assist educators and managers in planning for promoting healthier working environments as well as developing cost effective WRBPs prevention programs for HCNP. It is expected that measures aimed at the prevention of back problems would likewise diminish other musculoskeletal disorders, such as knee pain, as well. This baseline cross-sectional study can form the foundation upon which future case-control, prospective cohort, or intervention studies could be based.

CHAPTER TWO

THE LITERATURE REVIEW

A Conceptual Framework

To understand the phenomenon of Work-Related Back Problems (WRBPs) among Home Care Nursing Personnel (HCNP), a conceptual framework or theoretical model is essential to guide research endeavors. "The theory sets limits on what questions to ask and what methods to use to pursue answers to the questions" (Meleis, 1997, p. 20), and then the results of the research can "verify, modify, disprove, or support a theoretical proposition" (p. 20). It is generally believed that there are two major types of contributing factors that lead to the development of WRBPs: physical and psychosocial (Bernard, 1997; National Research Council, 1999). Physical demands (such as awkward postures, heavy loads, and vibration), and psychosocial stressors (such as subjective perceptions of organizational, and environmental factors) can trigger the physiological pathways that result in injuries or damage to soft tissues such as muscles, tendons, ligaments, fascia, cartilage, and intervertebral discs (National Research Council, 1999).

There are several existing models to guide research on musculoskeletal disorders, such as Melin and Lundberg's (1997) descriptive model, Sauter and Swanson's (1995) ecological model for computer work, and the National Research Council's (1999) model of musculoskeletal disorders. These models help in gaining an understanding of the phenomenon, however, they do not consider the unique working conditions of female-dominated HCNP. The working conditions of HCNP differ when compared to their counterparts in institutional settings and even most industrial/manufacturing workers, in at least three ways: the instability of workplace, the necessity to travel between sites, and the lack of resources in workplaces (i.e., patients' homes). Generally, most workers perform their tasks in one fixed worksite, whereas, the workplace for HCNP varies each day. Patients' homes are their worksites. Each home has a different design and does not incorporate ergonomics factors into the structure. Small bedrooms crammed with heavy furniture, nonadjustable beds, small bathrooms with no room for equipment, and the absence of mechanical lifting devices are all common in settings in which HCNP work (Hempel, 1993). "While many old hospital buildings are not conducive to good handling practices, patients' homes are usually even less so" (Hempel, 1993, p. 40). In addition, HCNP interact with patients and their families in private settings, acting as visitors, entering the patient's territory to provide nursing care. Hence, the physical environment and/or support or interruptions from the patients or families can create both physical and psychosocial stress for HCNP.

Another unique characteristic of HCNP job is the need to travel from one home to another. In some countries, such as North America, HCNP do this by driving; while in other countries, such as HK, HCNP walk or take public transportation. Physical and psychosocial stresses derived from traveling can be exaggerated by road conditions (e.g., holes, wetness, and traffic jams), and inclement weather (e.g., rain or snow). The occurrence of motor vehicle accidents, and slips, trips, and falls in or about patients' homes, deserves increased attention as a cause of WRBP in HCNP.

Finally, the unavailability of medical equipment, such as lifting and transferring devices can also affect the HCNP physically and psychosocially. HCNP usually lift and transfer patients alone, performing these procedures manually (Cheung, 1997; Myers, Jensen, Nestor, & Rattiner, 1993). In other health care settings, avoidance of unaided lifting is recommended (Lagerlof & Broberg, 1989) and even the implementation of "No Lift Policies" is suggested. However, this rational and laudable ideal would be almost impossible to implement in home care settings. When reviewing injury records, Myers and colleagues found that 88% of home health aides were working alone when back injuries occurred as compared to 39% of hospital nursing aides (Myers et al., 1993). In institutional settings, nursing personnel may make a judgment to lift on their own rather than get help or use a mechanical lift. However, HCNP often have no choice but to lift, position, or transfer the client alone (Cheung, 1997; Leff, Hagenbach, & Marn, 2000; Myers et al., 1993; Skarplik, 1988).

Traditionally, RNs perform the following nursing care in the home: wound dressing, drug administration, catheterization, teaching and counseling, among other tasks. Because of health care reform, however, more patients are discharged from the hospital sicker and more quickly, requiring home care services to assist in their recovery (Humphrey, 1988). As a result, home care services have become more technically complex, due in part to the ability to deliver advanced technology such as dialysis, chemotherapy, intravenous therapy, ventilatory support, and other acute care in the home (AMA Council on Scientific Affairs, 1990). Therefore, the nursing care traditionally performed in the hospitals has shifted to patients' homes.

However, in some countries, like HK, the shift is faster than the home care services can accommodate; thus, even the medical supplies in the home care organizations may be insufficient. Worldwide, RNs are required to prepare all the necessary equipment in their car or nursing bag before they visit each patient. Usually, they visit about five patients a day. Patients may need different amounts of supplies depending on their condition. Hence, besides the physical load from the heavy nursing bag, RNs have increased psychological demands due to the added responsibilities of assuring they bring sufficient equipment and materials including extra equipment to prepare for the lack of supplies in patients' homes and/or emergency situations. In summary, HCNP work in unpredictable, uncontrollable, and uncertain environments which are frequently in direct contrast with the controlled, standardized, and well-equipped environments of institutions.

Adapting ideas from various models, the investigator proposes a conceptual framework (See Appendix B) to guide this research on WRBPs in HCNP. This model is a variation on Sauter and Swanson's (1995) ecological model, Melin and Lundberg's (1997) descriptive model, and the National Research Council's (1999) model of musculoskeletal disorders. In addition, the work of Kagan and Levi (1975), Sauter, Hurrell, Murphy and Levi (1998), Karasek and Theorell (1990), Johnson and Hall (1988), and Siegrist (1996) has helped to frame the development of this model.

The first part of the proposed model includes objective work factors. Objective work factors are non-perceptual and can be measured objectively, such as the lifting techniques documented in worksite policies and procedures, or the minimum number of patients required to be seen per day by home care agencies. However, research questions derived from this perspective would ignore HCNP's perception on WRBPs. Since "man reacts to the work as he perceives it and not as it "really" is"(Borg, 1970, p. 92), it is important to understand WRBPs from the workers' perspective. For instance, in Cheung's (2000) study on workers' perceptions of organizational resources for low back injuries, more than 50% of the home care registered nurses (n = 400) did not know or were not sure if their employer had a back injury prevention program, orientation program or ongoing inservices regarding lifting and transferring techniques, and reporting procedures for low back injuries. These findings regarding a low level of organizational resources contradict the findings of Smith and White (1993) where a high level of resources was documented. In that study, according to the directors of the home care agencies, 83% of the agencies had a formal written policy on back care protection and lifting, and 86% provided education and training on this subject. This difference could be due to the fact that frontline nurses are often not familiar with policies and procedures, or are not aware of the existence of these policies. Therefore, it is important to focus on HCNP's perspective of WRBPs.

The two types of risk factors derived from objective work factors, related to WRBPs, are physical and psychosocial in nature. These two risk factors create two possible pathways to WRBPs. The first is the physical or physiological pathway. Physical demands involve force and posture. If those demands exceed a nurse's physical capability, then biomechanical strain will occur. Strain means that a "muscle, ligament, or tendon insertion has been pushed or pulled to its extreme by forcing the joint beyond its normal range of motion" (Hoaglund & Byl, 1997, p. 64). If a nurse has a previous history of back problems, or poor physical fitness, he or she may be more susceptible to physiological responses, such as muscle tension, tissue damage, slow unwinding of tissues, and other bodily reactions. Back problems could be the result of these physiological responses. As mentioned earlier, working conditions for HCNP are particular as they need to work in patients' homes, travel on the road, and work in the office. Therefore, physical risk factors for WRBPs among HCNP should be examined in these three "worksites."

Based on findings from prior studies, descriptive research questions concerning physical risk factors in patients' homes might include: (1) how much time do HCNP spend on lifting/carrying/pushing/pulling an object or patient? (2) how much time do HCNP spend in static postures, such as kneeling or squatting, bending or twisting trunk? (3) how much time do HCNP spend working on slippery or uneven surfaces? and (4) how much time do HCNP spend working from unadjustable heights?

Likewise, descriptive research questions regarding physical risk factors on the road might involve the following: (1) how much time do HCNP spend walking, standing, or climbing stairs? (2) how much time do HCNP spend riding a bus or train? (3) how much time do HCNP spend lifting/carrying/pushing/pulling an object? and (5) how much time do HCNP spend in prolonged postures?

Descriptive research questions concerning physical risk factors in the office include: (1) how much time do HCNP spend sitting, walking, kneeling, or squatting; and (2) how much time do HCNP spend working in limited working spaces?

The second pathway is psychosocial. Psychosocial factors refer to nurses' subjective perceptions of the objective work factors. In the proposed model, psychosocial factors include both work-related and non-work related dimensions. Work-related factors are job demand, control, and social support. Non-work related factors include domestic work (child care, elder care/dependent care, and housework). If the stress induced by the psychosocial factors exceeds the nurse's coping ability, she or he will experience psychosocial strain. Depending on the nurse's personality, culture, education, and medical history, he or she might have differing behavioral and psychological responses. Negative responses might exacerbate the physiological pathway to back problems; for example, increasing the number of patients to be seen by the HCNP most likely will increase psychosocial stress in addition to physical stress. The nurse might have behavioral responses such as smoking or walking faster, providing nursing care "efficiently" without thinking about proper posture. In addition, the psychological responses might be nervousness, depression, or job dissatisfaction. In the proposed model, back problems will be the outcome of both physical and psychosocial pathways.

Descriptive research questions concerning work-related psychosocial risk factors are: (1) how hard do HCNP work cognitively and sensationally? (2) do HCNP have the ability to make decisions about their job activities? (3) do HCNP have the freedom and autonomy to make decisions? (4) do HCNP have a lot of say on their job? and (5) do HCNP perceive support from co-workers, supervisors, patients, and relatives?

Descriptive research questions derived from domestic stresses are: (1) how many children are in the care of HCNP after work? (2) how many elderly persons are in the care of HCNP after work? (3) do HCNP have to do housework after work? and (4) do HCNP perceive their domestic work as hectic?

From the description of the proposed model shown above, one can see that personal factors are moderating factors, which influence both physical and psychosocial pathways at different points of time. One might argue that this is a victim-blaming approach. However, the investigator would rather argue that this is a proactive approach. According to the National Institute for Occupational Safety and Health (NIOSH), the development of job stress is due to a mismatch between working conditions and individual workers (Baker & Karasek, 2000).

Descriptive research questions arising from the personal arena are: (1) what are the demographic characteristics of HCNP, such as age, gender, education, position (job title), height, weight, and working experiences? and (2) monthly personal and household income.

In this proposed model, occurrence of back pain during the last 12 months, severity of symptoms, and functional disability are the outcomes of both physical and psychosocial pathways which are moderated by the personal factors.

Research Studies Related to WRBPs among HCNP

MEDLINE and CINAHL were used to search for studies related to WRBPs among HCNP. Keywords or subject headings related to back problems (such as "back pain," "low back pain," "back injuries," "musculoskeletal diseases," "occupational diseases," "occupational health," and "occupational exposure") combined with keywords or subject headings related to nursing personnel (such as "home care services," "home health aides," "public health nursing," "nurses," "nursing," "registered nurses," "licensed practical nurses," "nursing aides," "nursing attendants," "certified nursing aides," "certified nursing attendants," and "home health attendants") were used in both databases to locate the related literature for the period from January 2001 to March 2004. The literature search resulted in the identification of 33 home care-related publications. If studies met the following inclusion criteria, they were included in the literature review: (1) the study had to concern HCNP; (2) the study had to involve back region; (3) the purpose of the study had to be related to the prevalence or severity of back problems, or functional disability, or to occupational exposures, including personal, physical or psychosocial risk factors; (4) the study design was quantitative; and (5) the publication had to be a full report of a research study. Letters to the editor and abstracts were excluded. Seven publications met these inclusion criteria and will be discussed here. A search of the literature identified one British (Skarplik, 1988), one Canadian (Cheung, 1997, 1999, 2000), one Swedish (Brulin, Gerdle, Granlund, Hoog, Knutson, & Sundelin, 1998), one Dutch (Knibbe & Friele, 1996), and three American (Meyer & Muntaner, 1999; Myers et al., 1993; Smith & White, 1993) research studies related to WRBPs among HCNP. All of these studies indicated that HCNP were at risk for WRBPs (See Appendix C) and they faced unique risk factors. The review was organized by the type of data collection methods used in each study. Data collection methods used in these studies are injury records, employee surveys, and interviews.

Injury Records

Smith and White (1993) conducted a survey study of 173 directors of home health care agencies in Northern California, from the Oregon border to counties in the greater San Francisco Bay Area. The response rate of the study was 34% (n = 58). The purpose of the study was to assess (1) the nature of work performed by home health care workers; (2) the nature of occupational health programs; (3) the most common occupational injuries or illness in the previous year (July 1990 to June 1991); and (4) policies and educational programs in a number of quality assurance areas, including protection from back injuries.

The results indicated that the largest proportion of home health care workers (HHCWs) was registered nurses (n = 1,012; 36.5%), followed by home health aides/attendants (n = 769; 27.8%), physical therapists (n = 241; 8.7%), and licensed vocational nurses (n = 133; 4.8%). The participating agencies served between 25 to 1500 clients (mean [M] = 243) per year. The patients suffered from a variety of chronic diseases, including AIDS. Home health care personnel, on average, performed highly technical nursing procedures on 15% of their clients. These procedures included intravenous catheter insertion and care, phlebotomy, wound irrigation and dressing, tracheostomy care, and suctioning (Smith & White, 1993).

The results of this study showed that the most commonly reported occupational injury or illness for HHCWs was back injuries. Back injuries contributed 45.1% (n = 23) to the overall reported injuries during a one year period. Needlestick and musculoskeletal injuries (other than back) each contributed 13.7% (n = 7), followed by auto accidents (7.8%, n = 4), infections and exposures (other than needlestick) (5.9%, n = 3), and falls (3.9%, n = 2) (Smith & White, 1993). It is not clear how each agency recorded reported injuries; therefore, back injuries could have been imbedded in other categories such as auto accidents and falls. Although back injuries were the predominant mode of injury, only 82.5% of the agencies had a formal written policy on back care protection and lifting, and 86% provided education/training on the subject (Smith & White, 1993). One might argue that these figures are high. Caution must be taken, however, because the information was given by the directors of the agencies who may have responded in a way that they thought was socially acceptable. In addition, no information was provided regarding the method of training, such as length and frequency of training, and staff awareness of the policies.

The majority of the agencies were affiliated with hospitals (n = 27; 51.9%) which may not be typical of most home care agencies in the United States. Almost half of the administration and management of the occupational health programs were not in-house (n = 27; 46.5%); this suggests that HHCWs were unable to get the on-site services they may have needed in a timely fashion. Instead, they were required to make appointments and travel beyond the work setting in order to obtain treatment (Smith & White, 1993). This inconvenience could be a barrier for any employee seeking help from occupational health experts.

Despite the interesting findings of Smith and White's study, interpretation must be viewed with caution because of the less than ideal response rate (33.5%). Agencies that chose not to return the questionnaire might have done so because they lacked occupational health services. Systematic differences between the two groups could establish a sampling bias which poses a major threat to external validity. In addition, the information collected was provided by management and not from frontline staff. The directors reported information according to recorded data, such as the number of occupational injuries, nature of occupational health programs, and components of the programs. The results may have differed if the questionnaires had been given to frontline staff. Questions addressed to frontline staff may have provided a more complete view about policies and procedures, and their effectiveness. Because frontline staff probably would not have had the answers to the questions they asked, but they could have asked about staff satisfaction with off-site occupational health services, or asked them to list the last time they attended a training. In contrast, Cheung's study (2000) focused on home care nurses who worked in the field. In her study, the majority of the registered nurses in home care stated that they did not have adequate occupational health policies and programs. Employees are the target population who benefit most from occupational health and safety resources. If HCNP's opinions and views are not considered, back injury prevention programs may prove to be ineffective. This issue will be discussed further in a later section.

Smith and White's (1993) descriptive study provided general information about occupational health hazards among home health care workers, and concluded that back injury is the most commonly occurring occupational injury in home care. This leads to the following question: do HCNP have more back injuries than their counterparts in the institutional settings? Myers et al. (1993) conducted a comparison study between home health aides (HHAs) and hospital nursing aides (NAs) in the Baltimore-Washington area to address this issue. Data were collected from all incident reports of low back injuries from 1984 to 1986 among NAs at one large hospital ($\underline{n} = 35$) and HHAs at two of the largest home health care agencies ($\underline{n} = 56$) in the area. The purpose of the study was to test the hypothesis that the incidence rate of low back injuries among HHAs was higher than that of NAs working in hospitals. Results showed that HHAs had a higher number of back injuries than NAs, 56 for HHAs and 35 for NAs. In order to calculate the annual incidence rate of low back injury, the total number of NAs was obtained from the medical center's salary and wage survey and annual report to the Maryland Hospital Cost Review Commission, and the total number of HHAs was obtained from the records of the Personnel Director of the home health agencies. The incidence rate among HHAs, 15.4 per 100 FTEs, was significantly higher than the rate for hospital NAs, 5.9 per 100 FTEs ($\underline{p} < 0.001$). Contributing factors to injuries that were identified as possible risk factors for injury included the following: working alone (88% among HHAs and 39% among NAs), lifting, pushing, and pulling activities (over 50% for each group), activities involving patient's beds (40% for each group), and lifting without assistive equipment (80% among HHAs and 75% among NAs). Specific activities reported at the time of injury were: moving patients up in beds (21% among HHAs and 11% among NAs), helping patients in/out of beds (11% among HHAs and 6% among NAs), helping patients in/out of chairs (9% among HHAs and 3% among NAs), and catching patients who were starting to fall (9% among HHAs and 6% among NAs). Information about whether differences existed between HHAs and NAs on the above-mentioned contributing factors was not provided in the article. Identified risk factors for HHAs included helping patients in and out of tubs, stooping over patients who were in bed, helping patients get in and out of beds, driving automobiles to patients' homes, slipping without falling, making beds, stepping down to a lower level, and walking from dwelling (Myers et al., 1993). Since most injury activities are related to planned patient care, the investigators suggested that strategies for patient handling could be part of the planning process in the initial visit by the supervising registered nurse.

This is the first descriptive report of risk factors for low back injuries among HHAs and the first comparative study between NAs and HHAs in the United States. The investigators indicated that data abstracted from the incident reports included sociodemographic factors, date, time, and location of injury, and nature of the injury. From the descriptive section of the report, the circumstances of the event were abstracted to include type of movement, activity and tasks being performed, lifting equipment used, and people involved (Myers et al., 1993). Some of these data are obviously objective, such as date, and time of the injury, but clerical errors may have occurred during the collection or reporting phases. However, the accuracy of the incident report could be less reliable or less consistently coded with regard to the subjective data, such as type of movement and nature of injury. The persons who are responsible for recording the injury incident reports play a crucial role in determining the internal validity of the study. Differences in recording and interpretation of events could affect the accuracy of the data. Reliability is yet another issue. The investigators did not discuss how they dealt with the subjective information and missing data. No information was provided in the article as to how the information was coded, whether or not agreement on coding was provided by multiple investigators, and what procedures they undertook to assure inter-rater reliability. Lastly, the generalizability of the study is questionable since it involved only two home care agencies and one hospital. Although those institutions were among the largest in the Baltimore-Washington area, they were not randomly selected. Therefore, these institutions may not be representative of the target population.

Another comparison study was conducted by Meyer and Muntaner (1999). In this study, they examined the incidence, type, severity, and cost of injuries among nursing personnel in three settings: home care, nursing homes, and hospitals. Data were collected from the West Virginia Workers' Compensation database for fiscal years 1995 and 1996. Information from all claims in nursing, home health services, and related employment was compiled using both Standard Industrial Codes and occupational identifiers unique to the database. Data pertaining to nursing personnel in these three settings were extracted using occupational codes specific to the industry.

Results indicated that a total of 386 injuries occurred among HCNP with an annual incidence of 52 injuries per 1,000 workers. Excluding the injuries which did not result in lost time, the annual incidence was 43 injuries per 1,000 workers. These figures were higher than those for hospitals (46/1,000 for overall injuries, and 28/1,000 for lost time injuries), but lower than those for nursing homes (132/1,000 and 97/1,000 respectively). However, even though nursing home nursing personnel (NHNP) had a higher incidence of injury, injuries in HCNP resulted in greater lost time from work, and higher indemnity and medical care costs. For HCNP, the mean number of days lost from work was 44 (standard deviation [SD] = 106), the mean cost of indemnity payments was $1,523 (SD = $3,719), and the mean cost of medical payments was $1,276 (SD = $3,330). However, NHNP had fewer lost days from work (M = 18.9, SD = 57.3, $p < .001$), and lower indemnity payments (M = $909, SD = 3,848, $p < .001$) than HCNP (Meyer & Muntaner, 1999).

Overall, back injuries accounted for the greatest proportion (36%) of injuries in home care. More significantly, the average number of days lost from work (M = 60 days), indemnity payment (M = $2,054), and medical payment (M = $1,652) were much higher for back injuries than those described above for all injuries combined (SDs not provided by authors). In addition, NHNP had significantly fewer lost days from back injury as compared with those in HCNP (M = 27 days, $p < .001$ for Wilcoxon rank-sum test). Moreover, in home care, back injuries accounted for 63% of permanent partial disability awards and the average cost per claim was $3,048. In terms of the mechanism of injury, overexertion and falls comprised 63% of the total injuries in home care. Besides patient handling incidents, motor vehicle accidents were unique risk factors for back injuries in home care. During the two-year study period, motor vehicle accidents accounted for 14% of the total injuries in HCNP with an annual injury rate of 7/1,000 workers. This figure was significantly higher than the rate in nursing homes (0.2/1,000, $p < .001$) or hospitals (0.5/1,000, $p < .001$). Twenty-four percent of the vehicle injuries among HCNP resulted in back sprains (Meyer & Muntaner, 1999).

In the discussion, Meyer and Muntaner (1999) proposed that work organization was a potential risk factor for the high incidence and apparently greater severity of injuries among HCNP. As compared to their counterparts in institutional settings, HCNP had greater autonomy but had higher physical demands, and worked under conditions with less supervision and lack of assistance. With increasing cost-cutting measures implemented during the study period, HCNP needed to provide service to more patients within a specified unit of time. This kind of work pressure may counteract any preventive strategies initiated to reduce back injuries.

This is the first study to compare injury data among nursing personnel in three different settings, home care, nursing homes, and hospitals. Data fields obtained from the workers' compensation database included dates of injury and return to work, type and nature of injury, mechanism and cause of injury, ICD code, indemnity and medical payments, and awards for permanent impairment (Meyer & Muntaner, 1999). One of the potential threats to internal validity comes from using a secondary data source as the primary source of information, and how the original data obtained from the workers' compensation reports was interpreted. Little information was provided as to how the West Virginia Workers' Compensation Division categorized the injury, the nature, the mechanism and cause of injury. Information on coding practices was not clear and measuring intra- or inter-rater reliability is not commonly performed in non-research settings. Strategies used by the research team for interpreting and coding ambiguous or incomplete reports were not explained. Additionally, medical staff usually have limited training in the recognition, evaluation, and treatment of work-related injuries. Therefore, under-reporting of occupational back injuries would be happened due to differences in experience of treating physicians.

Limitations of using injury reports as a whole

Caution must be exercised when using statistical data based on reports of back injuries for prevention purposes. Workers' Compensation data have been criticized as being inadequate for comprehensively identifying workplace hazards. These data only include accidents involving human injury but they do not identify other conditions needing evaluation (Bird & Germain, 1986; Lees & Laundry, 1989; Reason, 1991; van der Schaaf, 1991). Lees and Laundry (1989) pointed out that understanding the causes of accidents will be limited if only incidents which produce injury are studied, because injury represents the tip of the iceberg (Bird & Germain, 1986). In 1969, a landmark safety study of industrial accidents revealed that, for every reported major injury (resulting in death, disability, lost time or medical treatment), there were: (1) 10 reported minor injuries, (2) 30 property damage accidents, and (3) 600 incidents with no visible injury or damage (Bird & Germain, 1986). This last category is referred to in the literature as near-mises, near-accidents, close calls, critical incidents, potential major injuries, or potential accidents (Lees & Laundry, 1989). The sequence of events which leads to a major accident is similar to the way dominoes fall onto and affect each other. In referring to the 1-10-30-600 ratio above, it is clear "how foolish it is to direct our major effort at the relatively few events resulting in serious or disabling injury when there are so many significant opportunities that provide a much larger basis for more effective control of total accident losses" (Bird & Germain, 1986, p.21).

Furthermore, injury data from workers' compensation or reported injury records underestimate the true number of back problems (Agnew, 1987; Harber et al., 1985). First, injured employees may choose not to report incidents for many reasons such as, lack of perceived severity of the accident, threat of disciplinary action, lack of effective treatment, guilt about non-compliance with procedures, or unclear reporting procedures (Levy & Wegman, 1995). Second, workers' compensation data cover only losses due to work-related injury or disease. These data are restricted to those claims that are made to and accepted by the workers' compensation agencies (Harvey & Lyons, 1993). Third, in some places such as Alberta, Canada, workers' compensation data are incomplete because one fifth of the workforce is not covered by the workers' compensation board (Alleyne, Dufresne, Kanji, & Reesal, 1989). Finally, underestimation of the incidence of back problems based on formal reports might be more pronounced for health care workers than others, as they may have access to informal consultation from health care colleagues and may tend to treat themselves (Agnew, 1987; Garg & Owen, 1992; Harber et al., 1985). Thus, the actual incidence of back problems may be higher than the purported figures indicate.

Employee Survey

Besides analyzing recorded injury data, some studies have used self-reported questionnaires to collect information on back problems in HCNP. Skarplik (1988) conducted a small-scale survey to determine the extent of back pain among community nursing staff in Oxford, London. Thirty-nine nurses returned questionnaires, however, information about the response rate was not provided in the article. Results showed that 56% of the respondents (n = 22) had suffered back, neck or shoulder pain in the last year. Fourteen of them (64%) had ever had back pain. Sixteen out of 22 (73%) believed that the cause of their pain was from lifting patients at home. Thirteen of them (59%) thought that the pain could have been prevented and suggested improvements in training, facilities, planning of lifts, patient co-operation, and assistance from another person. Ninety-five percent (n = 37) indicated that they had training in lifting techniques. However, the average duration of training sessions was five hours, with as little as half an hour up to a maximum of four days. In addition, the time lag since the nurse's last reported training session was on an average of three years, with an estimated range from one week to 10 years. The author emphasized that back injury might not result from one specific incident, but might follow a series of events. The author identified the following possible risk factors for back injuries in home care settings: low furniture, small working space, cramped conditions, postural stress of stooping, unexpected events, and prolonged spells of driving. The author further suggested six handling rules for patient lifting. These rules relied solely on manual handling including arm grip, elbow-lift grip, pelvic or waist-belt hold, axilla hold, and single-shoulder lift. The author's concentration on manual handling highlights that education is still the main focus on preventing back injury in home care workers (Skarplik, 1988).

The results of Skarplik's (1988) study provide a basic idea of back problems among home care nurses in Oxford but its generalizability is limited because of the small sample size (n = 39). The author also did not specify the job classification of the respondents. It is not clear whether they were registered nurses, licensed practical nurses, nursing aides or some combination of these groups. Since causes of back problems would be different based on job title, interventions might be different as well. Lacking job title information would hinder the ability to be compared with other studies. Moreover, the investigator did not provide information regarding the total target population in Oxford; hence the response rate is unknown. In addition, the investigator did not provide information regarding the validity and reliability of the questionnaire that was used.

In 1995, Cheung (1997, 1999, 2000) conducted a survey on low back injury among home care registered nurses in the province of Alberta in Canada. The purposes of this study were to determine the prevalence of low back injury, the prevalence of near-accidents for low back injuries, and nurses' perceptions of risk factors for low back injuries. A study-specific questionnaire was distributed to all registered nurses (n = 1114) who reported "Home Care" as their category of employment when renewing their registration for 1996 in the Alberta Association of Registered Nurses. A total of 400 registered nurses returned questionnaires, for a response rate of 36%. The definition of low back injury was provided in the questionnaire (i.e. an occupational injury which was triggered by a specific event at work and occurred in the area between the lower posterior costal margins and gluteal folds) (Cheung, 1997, 2000). In addition, the definition of a near-accident for low back injury was given to the respondents (i.e., an incident with no noticeable injury or damage). Two examples of near-accidents were also provided for added clarity (Cheung, 1997, 1999).

Results showed that 90% (n = 349) of 386 respondents considered the risk of low back injuries to be a problem in home care. Among all 400 respondents, 54 (14%) reported that they had experienced low back injuries within the previous 12 months, for a combined total of 79 low back injuries. The number of low back injuries occurring to any one nurse ranged from one to five. The annual prevalence of low back injuries was 14%, which may seem low. However, what made this study unique was that near-misses which could potentially lead to back injuries were accounted for. Two hundred and eighteen respondents (55%) had experienced near-accidents for low back injuries; thus, the annual prevalence of near-accidents that could potentially lead to low back injuries was 55%. Moreover, the number of near-accidents occurring in any one nurse ranged from one to forty-eight; therefore, a combined total of at least 602 near-accidents in the previous 12 months had occurred. The number of near-accidents was 7.6 times the number of actual low back injuries (Cheung, 1999).

When the home care nurses were asked to describe the three most serious situations that they thought led to low back injuries and three possible situations that could possible lead to injury, they identified some unique environmental risk factors not previously anticipated by the author. Icy or slippery road or floor surfaces, carrying heavy equipment, charts and bags, driving, and poor maintenance of clients' homes were the most frequently mentioned factors, while the more conventional risk factors of lifting and transferring clients were only ranked fifth and seventh respectively by the respondents. These findings suggest that home care nurses work in a sometimes uncontrollable and uncertain environment that is in direct contrast with the more controlled, standardized and well-equipped institutional environment (Cheung, 1999).

Besides environmental risk factors, organizational issues were also identified by participants. Nearly 70% of the respondents reported that they did not have or were not sure if their employers had a back injury prevention program. Nearly 34% reported that they did not have or were not sure if their employers had a written policy on reporting back injuries during the day. More than 50% reported they did not or were not sure if there were orientation programs on lifting and transferring techniques or devices and reporting procedures for low back injuries. In addition, more than 70% reported that they did not or were not sure if there were ongoing inservice education programs on lifting and transferring techniques or devices and reporting procedures for low back injuries (Cheung, 2000). These findings identifying a minimal level of organizational resources contrasted with the findings of Smith and White (1993), where 82.5% of the home care agencies stated they had had a formal written policy on back care protection and lifting, and 86% provided education/training on the subject. These differences could be due to the underlying differences with home care is conducted in each country, or more simply, that the frontline nurses were often not familiar with policies and procedures or that they did not know about the existence of these policies. However, if a back injury prevention program was effective, frontline workers should have been more familiar with the program (Cheung, 2000).

A limitation of this study is its relatively low response rate of 36% (n = 400). Although low response rates for survey studies are common, Polit and Hungler (1995) recommend a response rate greater than 60%. Owing to the low response rate, it is possible that systematic differences may exist between responding nurses (36%) and non-responding nurses (64%) in terms of the variables under study. In addition, those who declined to return the questionnaires might not have experienced back injuries and therefore did not perceive back injuries as a problem in their job. This sampling bias could pose a major threat to external validity. However, the large sample size remains a strength of this study. In addition, although the questionnaire was reviewed by experts and pilot tested for face and content validity, it had not been tested for reliability. The investigator could have performed the test-retest procedure to ensure reliability of the instrument. With regard to open-ended questions, the investigator used content analysis to categorize responses. Responses containing textual material relevant to a particular theme were identified and then grouped together under a specific variable. However, this procedure was performed by the investigator alone; thus, systematic errors could also have occurred in the interpretation of the data.

The research conducted by Knibbe and Friele (1996) is considered more reliable than Cheung's (1997, 1999, 2000) because of its large sample size (n = 355), high response rate (94%), and use of a well-tested instrument. The purposes of the study were (1) to investigate the prevalence of back pain and other physical problems among nurses working in home care, (2) to assess possible differences between community nurses (CNs) and community nursing auxiliaries (CNAs), and (3) to determine the presence of risk factors of physically demanding situations associated with the prevalence of back pain. In the Netherlands, CNs usually work as generalists and provide care for all types of patients. In 1987, there was one CN for every 2903 inhabitants, and approximately one CNA per three CNs. In this study, they used a modified Nordic questionnaire (Kuorinka et al., 1987) for the analysis of musculoskeletal disorders. It was mailed to the home addresses of all nursing personnel who were employed by the home care organization of the city of Rotterdam in the Netherlands (Knibbe & Friele, 1996).

Results indicated that the overall annual prevalence of back pain for both CNs and CNAs was 66.8% which exceeded the range found in other occupational groups (27–65%) by Burdorf (cited in Knibbe and Friele, 1996) in the same city. In addition, these prevalence figures are much higher than those reported by Hignett (1996) in institutional settings. However, the most controversial finding was that the community nurses (CNs) had a higher prevalence of back pain than the community nursing auxiliaries (CNAs) [see Table 1 below].

Table 1. Comparison of prevalence of back pain for CNs and CNAs in Knibbe and Friele's (1996) study.

Prevalence (%)	Total	CNs	CNAs	p-value
Life time	87	88.8	84.8	Not significant
12-month	66.8	71.4	61.2	*0.04
3-month	51.8	54.5	48.5	Not significant
7-day	20.6	19.6	22.4	Not significant

Note: * chi-square test, $p < 0.05$

These findings contradict those found in other studies in different settings. One would expect that nursing aides would have more back problems than registered nurses because they provide more physical care to patients. These differences could, however, reflect either differences in practice settings or, alternatively, underlying differences among countries in the work itself. Hence, results from studies from one country can be used as a reference but cannot necessarily be generalized to other countries.

Despite a higher prevalence of back pain in CNs in the study, back pain in CNAs resulted in a longer duration of sick leave. The mean number of sick day leave due to back pain for CNs was 5 days (SD = 2.9) while for CNAs, the mean was 27 days (SD = 34.8) (Knibbe & Friele, 1996). But for CNAs, the SD was much higher than the mean, indicating that there probably were some outlying values. Knibbe and Friele (1996) did not explain this discrepancy, but they mentioned that this was due to a few long-term absentees. In addition, although not statistically significant, the percentage of CNAs (68%; n = 80) that experienced pain lasting more than one day in the past three months during at least one episode was higher than that of the CNs (56%; n = 103). However, more CNs 5.3%; n = 189) than CNAs (4.8%; n = 165) went on sick leave due to back pain. Also more CNs (95%; n = 103) than CNAs (83%; n = 80) believed that their back pain was work-related (p = 0.02). Nevertheless, the majority of them continued to work without going on sick leave (94% for CNs and 89% for CNAs). However, a minority of both stated that they had exchanged patients with a colleague because of back pain (16.5% for CNs and 16.3% for CNAs) (Knibbe & Friele, 1996). The differences between CNs and CNAs could be due to differences in knowledge, reporting systems, and/or financial needs. Community nurses might have more knowledge about back pain and have less financial problems than CNAs; thus more CNs than CNAs may have believed that their back problems were work-related and therefore used sick leave. On the other hand, CNAs with less knowledge about back pain could possibly report their back problems at a later stage, resulting in more lost time from work.

Among the 355 respondents, more than half (51.8%) suffered from back pain in the three months prior to the study. Among those back pain sufferers, 5.1% went on sick leave and 59.3% stated that their pain was symmetrically located in and limited to the lower back. A minority (5.1%) reported pain radiating to one of their legs, possibly indicating nerve root compression, a more serious back condition. Another 3% of respondents stated they experienced back pain in the thoracic area (Knibbe & Friele, 1996).

Besides back pain, complaints in the past three months about other regions of the locomotor system were identified: (1) 34.9% reported neck or shoulder pain, and of these 72.5% believed that the pain was work-related, and 2.5% went on sick leave; (2) 18.4% reported knee pain, and of these, 49.1% were work-related, and 2.5% went on sick leave; (3) 1.7% reported arm pain, and of these, 48.6% were work-related, and 2.3% went on sick leave. With regard to these complaints, there were no significant differences between CNs and CNAs (Knibbe & Friele, 1996).

In Knibbe and Friele's (1996) study, respondents were asked to describe any moments they considered to be physically demanding and that were associated with back pain. The majority of the respondents stated that back pain was related to physically demanding activities and 89.9% ($\underline{n}$ = 319) actually described the situations. A majority of respondents (82.1%) related the situation to specific types of patient transfers, such as transfers of patients in bed associated with nursing activities (37.7%), repositioning in bed (up the bed or turning) (31.1%), and transfers from the bed to a chair or wheelchair or vice versa (21.6%). Another risk factor identified by respondents was a reported static load (23.2%) on the back, though the investigators did not report how they measured static load. Other physically demanding situations identified included lifting due to ergonomic complications (7.8%) (again, measurement was not specified), lifting with patient's relatives (2.8%), lifting in acute situations (1.6%) and lifting beds, handling prostheses, and supporting patient (Knibbe & Friele, 1996)s.

Respondents who experienced back pain in the previous three months (n = 184) were asked to describe the onset of their pain and if this was related to some specific moment or situation during work. However, only 61% (n = 112) were able to provide such details. Transferring patients was identified as a risk factor by only 47.3% (n = 53) of the respondents, which was dramatically dropped from 82.1%; while static load increased from 23.2% to 42% (n = 47). Other risk factors identified also included: lifting too frequently or too much (42%, n = 47), incorrect lifting techniques (16.1%, n=18), and acute situations (11.6%, n = 13). Finally, risk factors related to patients' homes were identified as well, such as lifting a bed that had fallen apart, moving a washing machine blocking the bathroom entry, picking up a cup of coffee, etc (Knibbe & Friele, 1996). These situations emphasize that physically demanding activities related to back pain in home care were not limited to lifting and transferring patients. The results of Cheung's study (1999, 2000) also support this conclusion.

The generalizability of this study to other home care nurses in Rotterdam may be possible since all potential HCNP were invited to participate and the response rate was extremely high (94%). However, whether or not the results of the study can be generalized to the other cities of the Netherlands or other countries is questionable. Working conditions of HCNP might be different from one city to the other city and from one country to the other country.

The questionnaire for Knibbe and Friele's (1996) study was modified, using the part of the Nordic Musculoskeletal Questionnaire (NMQ) that specifically deals with the back. Although the Nordic questionnaire has been tested for validity and reliability (Kuorinka et al., 1987), the modified questionnaire used in this study has not been tested for reliability and validity. Additional questions were added to the questionnaire such as identifying pain in other regions (arm, neck/shoulder, and knee), ways of coping with back pain, and the nurses' opinions as to the causes of their back pain (both open and close-ended). The investigators did not mention if the modified questionnaire had been reviewed by experts in home care for face and content validity. However a pre-test in home care (n=118) had been performed and this led to minor text and layout changes. It is beneficial to have a large sample size for a pilot test. However, it is not clear if the subjects in the pilot test were also included in the final study results. No test-retest procedure was performed to ensure reliability of the instrument. However, two observers were involved in categorizing the open-ended questions, though the authors did not delineate how this process was performed.

Besides the limitations discussed above, one major issue that has not been mentioned so far relates to the use of advanced statistical methods such as logistic regression as a means of identifying risk factors for WRBP. The articles discussed here used mainly descriptive statistics. Independent sample t-tests and chi-square tests were used in some studies. The review of literature identified one study (Brulin, Gerdle, Granlund, Hoog, Knutson, & Sundelin, 1998) that utilized multiple logistic regression analyses to identify the personal, physical and psychosocial risk factors for lower back pain.

Brulin et al., (1998) conducted a cross-sectional study to investigate the 7-day prevalence of and physical and psychosocial risk factors for lower back pain among female home care personnel in Skelleftea, Sweden. Among 1,100 women working within the home care service, 400 were randomly selected and invited to join the study. A total of 361 participants (response rate = 90%) participated into study. They worked in two kinds of workplaces, 172 in sheltered living and 188 in home help service. The NMQ was used to determine the 7-day prevalence of lower back problems. Personal risk factors included age, height, weight, duration of employment, working hours per week, and number of children living at home. Physical risk factors assessed were various sitting positions, standing in awkward postures, standing in forward-bent and twisted postures, and lifting in awkward postures. Psychosocial risk factors involved co-operation with supervisors, information about working conditions, possibility of influencing the planning of work, and perceived anxiety or worry at work (Brulin et al., 1998).

Results of Brulin et al.'s (1998) study indicated that the 7-day prevalence for lower back pain was 40%. The majority of the participants were married (89%) and 89% of them had children living at home. The average age of the participants was 46.8 years old (SD = 7.2). The mean employment was 11.5 years (SD = 7.2). Most of the participants worked part-time with a mean number of 28.4 working hours per week (SD = 5.8). The results of the multiple logistic regression analysis adjusted for age, working hours per week and workplace indicated that standing in a forward-bent and twisted posture (OR = 2.1, 95% CI = 1.3 - 3.5) was the only risk factor identified. Interestingly, children living at home was a protective factor for lower back pain (OR = 0.4, 95% CI = 0.2 - 0.8) (Brulin et al., 1998). The authors explained that children at home could protect

In conclusion, the following table summarizes the incidence and prevalence of WRBPs among HCNP. The risk factors identified from the literature review are physical (e.g., lifting and transferring, and awkward postures), psychosocial (e.g., lack of organizational resources, work stress, poor ergonomic designs in patients' homes, and poor road conditions), and individual (e.g., history of previous back problems, young workers, lack of work experience). However, only one combined physical risk factor, i.e. standing in a forward-bent and twisted posture (odds ratio [OR] = 2.1, 95% confident intervals [CI] = 1.3 to 3.5), and one personal protective factor, i.e. having children at home (OR = 0.4, 95% CI = 0.2 to 0.8) have been identified using multiple logistic regression analysis.

Table 2. A summary of incidence and prevalence of WRBPs among HCNP reviewed from the literature review

Incidence/Prevalence	HCNP	Registered Nurses	Nursing Aides	Back pain/Back injuries	References
Life time prevalence	87.0%	88.8%	84.8%	Back pain	(Knibbe & Friele, 1996)
12-month incidence			15.4%	Low back injuries	(Myers et al., 1993)
12-month prevalence		14%		Low back injuries	(Cheung, 1997)
	66.8%	71.4%	61.2%	Back pain	(Knibbe & Friele, 1996)
3-month prevalence	51.8%	54.5%	48.5%	Back pain	(Knibbe & Friele, 1996)
7-day prevalence	20.6%	19.6%	22.4%	Back pain	(Knibbe & Friele, 1996)
			40%	Low back pain	(Brulin et al. 1998)

against social isolation which had been identified as a risk factor for lower back pain by Frymoyer and Cats-Baril (1987).

Limitations of using employee surveys as a whole

All the studies discussed above were cross-sectional in nature. This study design involves looking at individuals who "are concurrently classified as diseased or disease-free and exposed or nonexposed at a single point in time" (Knapp & Miller III, 1992, p. 115). Some advantages of this design are: (1) it is less expensive than a prospective cohort study; (2) it can serve as a basis for a future prospective cohort study by identifying disease-free workers; (3) it can identify cases and controls for a case-control study. However, this design has disadvantages as well. First, there is the antecedent-consequence uncertainty such that the correct temporal relationship between the risk factor and work-related back injuries or back pain may remain ambiguous. Among epidemiological study designs, a cross-sectional study is ranked as the least likely to be able to establish causality (Knapp & Miller III, 1992). Secondly, they can be affected by the healthy worker effect by involving only currently employed workers, and excluding retirees and those workers who are not working temporarily or permanently due to the illness under study (Checkoway, Pearce, & Crawford-Brown, 1989). Lastly, all of the studies reviewed used self-reported questionnaires which might accentuate recall bias posing a threat to internal validity. For example, the subjects with back problems might search their memories more industriously for "causes" than those who do not have back problems. As a result, the subject with back problems might not only remember exposures more accurately than those without back problems, but they may also systematically overestimate or underestimate their exposures (Knapp & Miller III, 1992).

Measurement of Prevalence and Risk Factors

Each of the seven quantitative studies reviewed here used a cross-sectional approach. Myers et al. (1993), Meyer and Muntanner (1999), and Smith and White (1993) analyzed data from pre-existing injury records. Using injury reports could be problematic for the design of this current study for several reasons. First, accessing injury records in HK is not feasible because of cultural and political reasons. Secondly, underreporting might also be a problem (Agnew, 1987; Harber et al., 1985). Injured employees may choose not to report incidents for many reasons. Thus, the actual number of back problems may be higher than the reported data, making the reported cases less representative of the population of workers with WRBPs.

The last four studies used questionnaires for assessing the prevalence of and risk factors for WRBPs among HCNP. However, only one study used advanced statistical measures to determine the risk factors for WRBPs. Three possible disadvantages of using a cross-sectional approach are (1) the lack of evidence to determine the causal relationship between the dependent and independent variables; (2) relying on recall of the events; and (3) the healthy worker effect (i.e. involving only currently employed workers, and excluding retirees and those workers who are not working temporary or permanently due to the illness under study) (Checkoway et al., 1989). However, the main advantage of this approach is to examine one or more aspect of the problem, such as prevalence, incidence, various risk factors, with a large sample size especially if the literature review fails to reveal any significant research in the area. Since no study has been done to describe both the prevalence of and risk factors for WRBPs among HCNP in HK and limited related studies have been found worldwide, a cross-sectional study approach is an appropriate design for the present study. In addition, advanced statistical methods such as logistic regression analysis will be used. Consequently, the results of the study may lead to (1) development of hypotheses for future study, (2) ideas for case-control or prospective cohort studies, or (3) experimental studies that use biomechanical methods to measure forces, moments, and angular displacement affecting the lower back. In such a study, different techniques (such as direct measurement and videotaping) or equipment (such as lumbar motion monitor and electromyography) in patient's homes or laboratory settings could be used.

In summary, the present study was guided by a conceptual framework (see Appendix B) and an extensive literature review (See Appendix C). The conceptual framework illustrates how physical and psychosocial factors mediated by personal factors lead to symptoms of back problems and functional disability. Owing to the lack of studies on back problems among HCNP, a cross-sectional study with advanced statistical methods, (i.e. logistic regression), was used to determine the prevalence of and risk factors for WRBPs among HCNP in HK.

CHAPTER THREE

METHODOLOGY

Introduction

Although home care nursing personnel (HCNP) are at risk for work-related back problems (WRBPs), results of the literature review indicate that there is little knowledge about the prevalence of and specific risk factors for problems in this vulnerable population. Home care nursing personnel in Hong Kong (HK) might have higher risk of WRBPs than their counterparts in the other countries (such as Canada, the Netherlands, the United States, and Sweden), and they might face some unique risk factors due to walking, carrying a heavy nursing bag, and working in limited spaces. However, no study about these issues has been conducted in HK. Therefore, the purpose of this study is to describe the prevalence of and risk factors for WRBPs among HCNP in HK. A conceptual framework (See Appendix B) specifically targeted to home care working environments was used to guide this research.

Research Design

The target population for this cross-sectional, questionnaire-based study is HCNP who work under the Hospital Authority of Hong Kong. According to the Nursing Section of the Head Office of Hospital Authority (HOHA), there are about 500 nurses working in 32 Community Nursing Centers under the jurisdiction of 11 Hospitals. This group comprises the study sample for this study.

Subjects

All HCNP who work in Community Nursing Services (CNS) and Community Psychiatric Nursing Services (CPNS) were invited to participate into this study. Since the target population was determined to be of a manageable size, a total population sampling technique was employed in order to avoid any selection bias and to meet the sample size estimation shown below.

Power Analysis

See Appendix D for sample size estimation. Two power analyses were performed for the present study. One was for t-test comparisons and the other for logistic regression.

Power analysis for t-test

Based on Cohen and Cohen (1983), the sample size, 406, obtained in the present study could have the power of .95 to detect the effect size of .20 at 5% significant level.

Power analysis for logistic regression

Based on a computer program nQuery (Elashoff, 2000), the sample size, 406, obtained in the present study could have 94% power to detect an odds ratio of 1.50 at 5% significant level.

Survey Instrument

A questionnaire (See Appendix E) named Hong Kong Back Problems Questionnaire (HKBPQ) was developed by the investigator based on the information from the literature, the conceptual framework, a previous related study (Cheung, 1999, 2000), and suggestions from the proposal defense committee at the University of California, San Francisco. Several instruments (Halpern, Hiebert, Nordin, Goldsheyder, & Crane, 2001; Johnson & Hall, 1988; Karasek, 1979; Kuorinka et al., 1987; Martin, Engelberg, Agel, & Swiontkowski, 1997; Rossignol & Baetz, 1987; Viikari-Juntura et al., 1996; Wiktorin, Karlqvist, & Winkel, 1993; Wiktorin, Wigaeus, Winkel, & Koster, 1996) were modified to measure the variables under study. There are four sections in the HKBPQ. Section I is concerned with the workload in relation to physical risk factors. Participants were asked about their normal work schedule per week and their work activities on the last day that they worked. Section II focused on information about pain in different parts of the body, such as the upper back, lower back, neck, shoulders, knees and other areas. For those who reported upper or lower back pain, additional questions were asked in Section III about functional outcomes related to their back pain. Section IV asked about psychosocial risk factors related to the subjects' home care job and their work at home. Section V asked subjects to provide personal and demographic information.

Validity of the Instrument

The HKBPQ was reviewed by seven experts in the field of occupational health or home care to ensure face and content validity. The panel consisted of three committee members in the United States, one professor teaching occupational health in Canada, and three local experts (one works in the Labor Department, and two work in home care). They were asked to rate each item and the entire questionnaire using a 4-point scale (1 = not relevant, 2 = unable to assess relevance without item revision, 3 = relevant but needs minor alternation, and 4 = very relevant and succinct) (Lynn, 1986). The strength of validity was interpreted in terms of a content validity index (CVI). The overall CVI for HKBPQ is 0.95. Portney and Watkins (1993) recommended a CVI greater than 0.75 for a newly developed instrument.

Dependent Variables

The Nordic Musculoskeletal Questionnaire (NMQ)

The dependent variables of this study are the 12-month prevalence of WRBPs, severity of symptoms, and functional disability. The annual prevalence of WRBPs and severity of symptoms were measured by a modified NMQ (See section II in Appendix E). Three questions were asked in regard to prevalence, i.e., "During the last 12 months, have you had pain in the upper back and/or lower back?", "If yes, is the pain caused or aggravated by your work?", and "If yes, list the work activities that you think contributed to your pain". The response for the first two questions was dichotomous (yes or no). In addition, six questions were asked regarding the severity of their back pain. For instance, participants were asked if their back pain affected their leisure and work activities. They were also asked to estimate the number of sickness or absence days they had had relative to upper or lower back pain.

The NMQ was developed by a group of Nordic researchers for three purposes. First, it serves as a screening tool for work-related musculoskeletal symptoms (pain/ache/discomfort), such as low back, neck and upper limbs in an ergonomic context (Baron, Hales, & Hurrell, 1996; Kuorinka et al., 1987). The results of the screening potentially provide information for analyzing the work environment, workstation, and tool design (Kuorinka et al., 1987). Second, clinicians in the occupational health service may use the NMQ for the purpose of diagnosis of work strain and for the effects of interventions on improving the work environment. Third, the NMQ can act as a standardized questionnaire for the analysis of work-related musculoskeletal symptoms, making comparisons of results from different epidemiological studies possible.

However, it is clear that the NMQ is not designed for clinical diagnostic purposes (Kuorinka et al., 1987). The NMQ is the most widely used symptom survey tool worldwide, especially in Europe (Baron et al., 1996), such as Denmark, Finland, Norway, and Sweden (Kuorinka et al., 1987). The NMQ has been used in more than 100 different projects as well as routine use in occupational health services. In addition, one or more questions have been administered to over 50,000 persons (Kuorinka et al., 1987).

The NMQ consists of structured, forced, binary or multiple-choice variants and can be self-administered or used in an interview format. There are two types of NMQ questionnaires, the general and specific questionnaire. The general NMQ is a simple survey about symptoms in 9 body parts using a body map diagram, while the specific NMQ focuses on the low back, and neck and shoulder areas (Kuorinka et al., 1987). The general and the low back NMQs were modified for use in the present study.

Reliability and validity of the NMQ.

The original Nordic committee reported the reliability and validity of the NMQ (Kuorinka et al., 1987). The test-retest methodology and percentage of disagreement were used to determine the reliability of both the general and specific NMQs. Results showed that the percentage of disagreement for the general NMQ ranged from 0-23% in three cohorts (i.e. 29 safety engineers, 17 medical secretaries, and 22 railway maintenance workers). However, the report did not provide information about the time interval used for the test-retest evaluation. The low back NMQ was tested on 25 nursing staff with a 15-day interval. The percentage of disagreement ranged from 0 - 4%, except for one question where it was 25%. It is not clear what that question was, however, the authors indicated that this particular question was redesigned in the final version.

The original report also provided information regarding the validity of the NMQ (Kuorinka et al., 1987). Criterion validity was performed to test both the general and neck/shoulder NMQs but not the low back NMQ. The responses from the general NMQ were tested against clinical histories. Results showed that the percentage of disagreement varied from 0 – 20% in two cohorts (19 medical secretaries, and 20 railway maintenance workers). However, validation test procedures, such as who collected the clinical history from the subjects, were not clear.

Another study was conducted in Sweden by Holmstrom and Moritz (1991) to test the validity of a modified low back NMQ. Two additional questions were added to the original low back NMQ. The first question asked about the frequency of low back trouble during the last 12 months. This new question used a 5-point pain frequency scale (never, seldom, sometimes, often and very often). The second added question, measuring the degree of functional impairment, used a 4-point pain severity scale (slight = ability to do most things in spite of pain; moderate = ability to carry out activities at work and during leisure time in spite of pain; severe = necessity to take pauses because of pain; and very severe = periods of sick-leave) (Holmstrom & Moritz, 1991).

Holmstrom and Moritz's (1991) modified low back NMQ questionnaire was sent to a randomly selected sample of active Swedish construction workers through their trade union. The response rate was 75% (1772 men and one woman). Of these 1773 respondents, those with low back trouble for more than 30 days (n = 136), and those with no lifetime low back trouble (n = 70) were randomly selected for interview and clinical examination. The clinical examination was performed by an experienced physiotherapist. The results of the examination were considered positive if pain was present in active spinal mobility tests in standing positions, in the straight leg raising test, and during the springing test. However, discomfort due to muscle tenseness was not regarded as a positive result. Immediately after the clinical examination, the respondents were interviewed by a nurse to obtain information about localization, intensity, and duration of pain, periods of sick-leave, and consequences of pain at work and during leisure time. It is important to note that the time interval between clinical examination/interview and questionnaire responses ranged from 1 to 3 months, with the mean being 1.5 months. The percentage of agreement was used to determine the strength of the agreement and the gamma statistic (G) was used to measure correlation between different scales. It ranges from –1.00 to 1.00 with zero indicating the two scales are independent (Holmstrom & Moritz, 1991).

Results showed that of the 70 respondents who reported no life time low back trouble originally, 44 (63%) respondents were still determined to have no life time trouble at the time of the interview, and all 44 (63%) had a negative clinical examination. Daily low back trouble was self-reported by 51 workers, but only 45% (23/51) had current low back trouble at the interview, and of those 21 (41%) were classified as positive after the clinical examination (Holmstrom & Moritz, 1991). The results should be interpreted with caution because the 1- to 3-month time interval between questionnaire responses and clinical examinations/interviews could possibly make a difference when investigating symptoms of low back trouble. Additionally, the interpretation of low back trouble might be different for the respondents than for the physiotherapist and/or nurses. In the low back NMQ, respondents were asked about low back symptoms such as pain, ache or discomfort. However, only pain was used as the criterion for positive signs in the clinical examination. Lastly, the symptoms of low back trouble were very subjective and not many objective measurements could be used to diagnose low back troubles. Considering the limitations of the study design and weak relationship between self-reported low back trouble and the clinical findings, the percentage of agreement was acceptable (since all of them were above 40%).

As well as questions about the validity of the NMQ, findings about one added question in the modified low back NMQ is worthy of detailed discussion. The new question concerning the frequency of symptoms using the 5-point frequency scale (categorized from "never" to "very often") was compared with the original question concerning the duration of symptoms (categorized from "zero days" to "every day") in the last year. The correlation between the responses of the two questions was high ($G = 0.76$, $n = 1289$) and statistically significant ($p < 0.001$) (Holmstrom & Moritz, 1991). Since there was a high positive correlation between the two scales, respondents with a high frequency of symptoms seemed to experience a longer duration of symptoms. However, it is interesting that respondents with various frequencies of symptoms (i.e., "sometimes" = 38%, "never" = 34%, "seldom" = 20%, "often" = 8%, and "very often"= 1%) reported "zero days" duration of symptoms in the last 12 months. One possible explanation for these observations was that subjects might have interpreted the questions differently. In addition, respondents might relate "duration of symptoms" to "duration of sick leave." For example, the strong agreement (69%) between the question concerning the duration of inability to do normal work and duration of sick leaves found in this study might support this explanation. Because of this misinterpretation, the question concerning the duration of inability to do normal work was reconstructed to specifically measure the number of sick leave or absence days in the present study.

Relevance of the NMQ for studying WRBPs among HCNP in HK

Generally speaking, the NMQ is very relevant for the study of WRBPs, especially among HCNP. As mentioned earlier, there is no study on the prevalence of WRBPs in this population in HK. The purpose of the NMQ is to screen for the existence of workplace-related back problems. In addition, the NMQ has been used in different studies to describe the WRBPs among HCNP (Brulin, Gerdle, Granlund, Hoog, Knutson, & Sundelin, 1998; Elert, Brulin, Gerdle, & Johansson, 1992; Gerdle, Brulin, Elert, & Granlund, 1994; Hedin, 1997; Johansson, 1995; Knibbe & Friele, 1996; Lundberg & Gerdle, 2000; Torgen, Nygard, & Kibom, 1995). Since the NMQ has been used in the HCNP, the results of future studies in other countries using the NMQ can be used to compare and contrast results obtained from previous studies.

The Short Musculoskeletal Functional Assessment Questionnaire (SMFAQ)

Besides using the modified NMQ, the bother index (See Section II in Appendix E) of the SMFAQ was also used to assess the functional outcomes of the WRBPs among HCNP in HK. The SMFAQ was developed from the long version of the Musculoskeletal Functional Assessment Questionnaire (MFAQ). Items were selected from the MFAQ if they had high test-retest values (k > 0.70), and they were clinically and conceptually important, among other things (Swiontkowski, Engelberg, Martin, & Angel, 1999). Both versions were designed to detect differences in the functional status of patients who have musculoskeletal disorders, such as soft-tissue injuries, repetitive motion injuries, fractures, and osteoarthrosis. The most unique part of the SMFAQ is that it allows patients to evaluate how bothered they are by their functional problems. The bother index is comprised of 12 items, measured on a 5-point scale (1 = not at all bothered; 5 = extremely bothered) that assesses how much the patients are bothered by the problems in broad functional areas, such as recreation and leisure, sleep and rest, work, and family (Swiontkowski et al., 1999). The scores for the bother index are tabulated by summing the responses to the items, and then transforming the scores into a range from zero to 100 using the following formula: ({[actual raw score – lowest possible raw score]/possible range of raw score} x 100). Higher scores indicate poorer function. For the bother index, missing items within a category are treated as missing data because substitution with mean values is not appropriate since each item addresses a unique functional area (Swiontkowski et al., 1999).

Reliability and validity of the bother index.

A study was conducted to determine the reliability and validity of the SMFAQ (Swiontkowski et al., 1999) on 420 patients from 18 orthopaedic clinics across the United States. Among those 420 patients, 17 (4%) had an acute fracture or soft-tissue injury of the spine, and 25 (6%) had a chronic condition of spine. Most of the patients (n = 370, 82%) had an acute fracture, soft-tissue injury, or repetitive-motion disorder of upper and lower limbs. In addition, this study included patients who were injured at work (n = 37). The subjects completed questionnaires twice in a 3-month interval for baseline and follow up data. The Cronbach's alpha coefficient for each administration of the bother index was 0.92 and 0.95 respectively, demonstrating high internal consistency. A subgroup of 150 patients was selected for test-retest reliability comparison. The mean time interval between administration of the baseline and follow-up questionnaire was 7.8 days (SD = 1.62). The intraclass correlation coefficient was 0.88 for the bother index.

Additional tests demonstrated that the SMFAQ was valid in terms of content, criterion, and construct validity. The content validity for the bother index was supported by a wide range of scores (ranging from 0 to 94); very little skewness (below 1); the lack of floor effects, and very little ceiling effects (2.5%). Criterion validity was demonstrated by significant correlations between the index and the physician ratings of patients' function. Spearman's rank correlation coefficients (r_s) were used to determine the strength of the correlation. One of the "gold standards" used in this study were ratings of patients' function by orthopaedists, using an 11-point scale (0 = the best function and 10 = the poorest function). Five areas were assessed: mobility of lower extremities (r_s = 0.29), mobility of upper extremities (r_s = 0.20), activities of daily living (0.50 > r_s > 0.40), recreational and leisure activities (r_s > 0.40), and emotional function (0.50 > r_s > 0.40). The low correlation seen between the mobility of the extremities and the physician ratings could be due to the summary score in the bother index that describe function in a number of areas while the physicians assessed specific functional areas (i.e., mobility of lower and upper extremities, activities of daily living, recreational and leisure activities, and emotional function). Another possible explanation is that the patients rated their usual function while the physicians rated the optimal function as they saw the patient in the clinic. Generally, that is one reason why scores of self-rated measures of disability tend to correlate better with other subjective measures than with objective criteria (Roland & Morris, 1983)

Construct validity of the bother index was also supported by convergent and group different construct validity. Convergent validity was demonstrated by the significant correlation between the index and the SF36 subscales ($r > 0.50$, $p < 0.001$). The group different construct validity was determined by asking patients a question regarding their life changes due to illness: "How much has your injury or arthritis changed your life – not at all, a little somewhat, quite a bit, or completely?" (Swiontkowski et al., 1999, p. 1251). This question was used to determine the SMFA's ability to discriminate between patients who had and those who did not have functional problems. Patients were classified as having a functional limitation if they answered "quite a bit" or "completely"; while patients were classified as not having a problem if they answered "not at all" or "a little." Results demonstrated that the index had sensitivity (.87) and specificity (.84) greater than .70.

Relevance of the bother index for studying WRBPs among HCNP in HK.

The SMFAQ has been tested with groups of patients who have had musculoskeletal disorders including back injuries, back pain or injuries at work. The psychometric properties of the questionnaire are promising. However, using the word "bother" was determined to not be appropriate on all 12 items in the context of Chinese language. The process of forward and backward translations determined that the most appropriate word to be used was "interfere". Participants were asked to estimate how much their back pain had interfered with their daily life during the last four weeks. For instance, "How much does your back problem(s) interfere with the use of your hands, arms, or legs?" or "How much does your back problem(s) interfere with your thinking, concentrating, or remembering?"

Independent Variables

Personal Risk Factors

The independent variables were divided into three major domains, personal, physical, and psychosocial risk factors that are illustrated in the conceptual framework (See Appendix B). Personal factors were measured based on the investigator's previous work where face and content validity has been tested. (Cheung, 1997) (See section I in Appendix E).

Physical Risk Factors

The physical risk factors were measured using the following questionnaires: a modified version of the MUSIC-1989 (Wiktorin et al., 1993; Wiktorin et al., 1996); the MUSIC-1993 (Torgen, Alfredsson, Koster, Wiktorin, Smith, & Kibom, 1997); the MUSKELI (Viikari-Juntura et al., 1996); the Occupational Risk Factor (RFQ) (Halpern et al., 2001); and the Task-Related Risk Factor (TRRFQ) (Rossignol & Baetz, 1987) (See section III in Appendix E). A summary of the reliability and validity results from these studies is presented in Appendix F. Physical risk factors for WRBPs are usually measured by forces and postures. When measuring forces through use of questionnaires, questions regarding lifting or carrying less than 5 kg have not been shown to be reliable or valid (Wiktorin et al., 1993; Wiktorin et al., 1996). In two studies, combining lifting and carrying questions into one question increased the reliability for $\underline{r}_i$ from 0.53 to 0.66 (Torgen et al., 1997; Wiktorin et al., 1996). Therefore, asking subjects to determine forces of less than 5kg were not included in this current study. In addition, participants were asked to estimate their time spent on lifting or carrying objects in patients' homes or nursing homes, on the road, and in the office.

In terms of postures, self-reported measure of sitting and walking have been determined to be consistently valid through use of different scales (Viikari-Juntura et al., 1996; Wiktorin et al., 1993). Determinations of the trunk in a forward bent or rotated positions, and the head in forward bent position have not been shown to be valid (Viikari-Juntura et al., 1996; Wiktorin et al., 1993). Measurement of static postures was also determined to be invalid in one study (the degree of agreement between hospital employees and independent worksite observer on static postures was low) (Rossignol & Baetz, 1987). Inconsistent results regarding validity were also found on neck rotation and use of hands above shoulder level (Viikari-Juntura et al., 1996; Wiktorin et al., 1993).

Results of the literature review also indicated that response scales used might affect the reliability and validity of the questions. In the MUSIC-1993 questionnaire (Torgen et al., 1997), questions regarding trunk postures in the MUSIC-1989 (Wiktorin et al., 1996) were combined into one question, i.e., bent or twisted body posture. This new combined question (r_i = 0.74) (Torgen et al., 1997) had a higher reliability than the separate questions (r_i ranged from 0.52 to 0.59) (Wiktorin et al., 1996). Questions involving manual handling in the MUSIC-1989 were also combined into one question, i.e., lifting/carrying loads of 5-15kg or more than 15kg. Reliability measures (r_i) of these new combined questions (ranged from 0.83 to 0.89) (Torgen et al., 1997) also had a higher reliability than the individual questions (r_i ranged from 0.53 to 0.66) (Wiktorin et al., 1996). However, the reliability of combined questions dropped if the new questions were too complicated. For example, the new combined question "repetitive hand or finger movement several times per minute exceeding 2 hours per day" (r_i = 0.64) had a lower reliability than the original question in the MUSIC-1989 "repetitive finger movements several times per minute" ($\underline{r}_i$ = 0.71) (Torgen et al., 1997; Wiktorin et al., 1996). This analysis concludes that combining two dimensions (i.e., bend and twist, or lift and carry) in a similar variable (i.e., trunk posture and manual handling respectively) into one question can increase reliability, but not when combining two dimensions of the variable with frequency and duration. Therefore, in the present study, generally, information about one body posture only (such as bending, squatting, and kneeling) was requested in each item except one combined question (i.e. twisting or rotation).

The RFQ was tested for reliability four times, three of which showed that the RFQ items were reliable ($\underline{k}$ > 0.40) (Halpern et al., 2001). Even the items concerning trunk bent forward, and trunk rotation were deemed to be reliable. These two postures had been shown to be reliable or valid in the MUSIC-1989 studies (Wiktorin et al., 1993; Wiktorin et al., 1996). This might have been due to the duration scale used, which asked the subjects to estimate the percentage of their workday (e.g., 10%, 25%, 50%, 75%) spent in specific task rather than the actual hours or a fraction of the day spent on these tasks. Therefore, in the present study, the duration of exposure to the physical risk factors was assessed using percentage of time the HCNP spent in three different "worksites": in the patients' home, on the road, and in the office. In addition, the responses for each participant in each "worksite" were summed and the mean score computed was used in the analyses. Only 20% missing data was allowed when tabulating the mean score. That is, if a participant had more than 20% missing data in one "worksite", the mean score for her/him on that "worksite" would be treated as a missing data.

The TRRFQ is the only questionnaire in the literature review that is concerned with static postures. Results have shown that questions about static postures were not valid (Rossignol & Baetz, 1987). This could be due to a low awareness of those postures among subjects as compared to the observers' perceptions. Static postures have been identified as one of the physical risk factors for WRBPs among HCNP in the Netherlands (Knibbe & Friele, 1996). Therefore, in the present study, static postures were assessed by using the word "prolonged" to focus participants' attention to this concept.

Psychosocial Risk Factors

Psychosocial risk factors were measured using a modified Job Content Questionnaire (JCQ) and the social support questions used in the Johnson and Hall modification of the JCQ (Johnson & Hall, 1988) (See section IV in Appendix E).

The Job Content Questionnaire (JCQ).

The JCQ is one of the most frequently used self-administered questionnaires in the world for measuring the social and psychosocial characteristics of jobs. It has been widely used in North America, Europe, and Japan (Landsbergis & Theorell, 2000), and translated into at least seven non-English languages, such as French-Canadian, French-Belgian, Flemish-Belgian, Spanish, Swedish, Dutch, Italian, and Japanese (Karasek, Brisson, Kawakami, & Amick III, 1998). The data collected from samples in the U.S. or other countries are capable of being compared to the national U.S. scale averages by job title, sex, and industry code (Landsbergis & Theorell, 2000). The core of the JCQ consists of 27 items derived from the U.S. Quality of Employment Surveys (QES) and administered to nationally representative samples of workers in 1969, 1972, and 1977. In 1985, version 1.1, the "full JCQ," (49 items) was developed by adding eight additional items from the QES as well as 14 new questions. In 1995, version 1.5 of the JCQ (56 items) was developed by adding a set of seven items concerning the global economy to the previous version (Landsbergis & Theorell, 2000). All three versions of the JCQ consist of the following subscales: decision latitude, psychological job demands, social support, physical job demands, and job insecurity.

The best-known subscales of the JCQ are psychological job demands, decision latitude, and social support. The high-demand/low-control/low-support model contends that workers who work in jobs with these characteristics will likely to experience psychological strain (i.e., fatigue, anxiety, depression) and physical illness (i.e., cardiovascular diseases and musculoskeletal disorders. Landsbergis and Theorell (2000) reviewed six major cardiovascular disease studies from the United States, Canada, the Netherlands, and Japan and found that the means and standard deviations of subscales were similar across the six studies, and internal consistency tended to be similar across populations as well. The average Cronbach's alpha for women was 0.73 and for men was 0.74. This review also indicated that most studies using the JCQ typically have utilized a response scale ranging from "strongly agree" to "strongly disagree" (Landsbergis & Theorell, 2000). Therefore, for the present study, a 4-point scale (1 = strongly disagree and 4 = strongly agree) was used.

A review of the literature found one study using the 26-item JCQ to measure musculoskeletal problems among 1,449 transit operators (Krause, Ragland, Fisher, & Syme, 1998). Five subscales were included in the JCQ: psychological demands, decision latitude, job dissatisfaction, coworker support, and supervisor support. Results of the study indicated that spinal injuries (including both neck and back) were predicted by psychological job demands (odd ratios [OR] = 1.50, 95% confidence interval [CI] = 1.33-1.95), job dissatisfaction (OR = 1.56, 95% CI = 1.09-2.23); and, to a lesser extent by low supervisor support (OR = 1.30, 95% CI = 0.99-1.72) (Krause et al., 1998). However, in the present study, only four of these five subscales of the JCQ (See section IV in Appendix E) were used to assess psychosocial risk factors for WRBPs among HCNP in HK. Since HCNP interact with patients and their family members, support from patients and family members were assessed as well. Additionally, psychosocial questions regarding domestic work performed at home were included in the final questionnaire.

<u>Social support at work in the demand-control-support model.</u>

Johnson and Hall (1988) integrated the Demand/Control Model (DCM) developed by Karasek (Karasek, 1998; Karasek & Theorell, 1990, 2000) with the work-related social support dimension and developed a demand-control-support model (DCSM). The DCM uses two dimensions to describe the psychosocial characteristics of work: psychological demands and decision latitude; thus, four quadrants (high strain, active, low-strain, and passive) are formed. The job strain hypothesis predicts that workers with high psychological demands but low decision latitude (i.e., the high strain quadrant) will experience psychological strain and physical illness while workers with high psychological demands and high decision latitude (i.e., the active quadrant) will experience average psychological strain (Karasek, 1998; Karasek & Theorell, 1990, 2000). In DCSM, the social support at work is dichotomized into isolated or collective conditions. This model has been tested to predict cardiovascular disease in a Swedish working population (male = 7,165 and female = 6,614) (Johnson & Hall, 1988). The social support at work variable was measured using a scale consisting of five dichotomous questions: the ability to talk to co-workers during breaks, leave their job to talk with co-workers, interact with co-workers as part of their work, meet with co-workers outside the workplace, and meet with their co-workers during the last six months. The Cronbach's alpha of these five questions was 0.75 and the average item-to-total correlation was 0.70. The results of the study showed that, interestingly, active workers with low social support at work had the highest age-adjusted prevalence ratios (PRs) for cardiovascular disease (PRs = 2.55, 95% confidence interval = 1.38 – 4.71). The next highest age-adjusted PR was found in high-strain workers with low social support at work (PRs = 2.17, 95% CI = 1.32 – 3.56) (Johnson & Hall, 1988). In conclusion, although active workers in the DCM have average psychological strain, if they lack social support at work, their risk for physical illness may be greater than that of the high-strain workers with low social support at work. Therefore, in the present study, these five questions, using a 4-point scale (See section IV in Appendix E) regarding social support at work were included to assess the psychosocial factors for WRBPs among HCNP.

Translation from English to Chinese

The HKBPQ had been reviewed by three PhD-prepared supervisory committee members at the University of California, San Francisco, and other experts to ensure face and content validity. This expert panel consisted of experts in ergonomics, home care, back problems, and occupational health and safety. After testing for validity, the HKBPQ was translated into Chinese by a person who is fluent in both English and Chinese. This translation was performed by a lecturer who teaches in the department of Chinese and bilingual studies in a HK university. Subsequently, the Chinese version was back-translated to English by another person, also fluent in both English and Chinese to ensure that the content of the Chinese version was the same as that in the original HKBPQ English version. This backward translation was performed by a researcher who had been working in the translation field for 10 years (see Appendix E for the Chinese version of HKBPQ).

Pilot testing

After the translation was completed, the HKBPQ Chinese version was pilot tested with 10 HCNP in HK. The questionnaire then underwent a further test for reliability using a 2-week test-retest procedure on additional sample of 10 HCNP in HK. Minor changes were made to the questionnaire based on the results of the pilot study.

Ethical Considerations

Ethical clearance was obtained from the Nursing Section of the Head Office of Hospital Authority (HOHA), the Hong Kong Polytechnic University, the University of California, San Francisco, and each hospital's research committee that authorized the study (see Appendix G). A cover letter and the HKBP questionnaire were distributed to all HCNP. Participation in this study was voluntary and without financial remuneration. Only those respondents who were willing to participate in future studies, such as potential qualitative and case-control studies, provided their names and contact phone numbers; otherwise, no identification of the name or affiliated hospital was recorded on the questionnaire. No written consent form was required in this study, as completing and returning the questionnaire served as the consent to participate. Only the research team members had access to the completed questionnaire. Hence, anonymity and confidentiality were able to be maintained. Since the questionnaire was the only method of data collection, no physical or psychological risks were inherent in the study. Subjects had the freedom to determine if they wanted to participate in the study. Subjects were welcome to discuss questions and concerns at any time by contacting the investigator.

Data Collection Procedures

After all ethical approvals were obtained, the investigator contacted the nurse in charge in each community center to make an appointment to meet with the HCNP. The purpose and procedure of the research was explained to familiarize HCNP with the study and to gain their support for the study. Some of charge nurses allowed the investigator to meet with staff during a meeting and fill out the questionnaires. Some only gave the investigator 10 minutes to promote the study and they then collected the questionnaire over a one to two week time period. Two envelopes, used to collect questionnaires or contact information, were given and kept in a place that the staff could access. Participants were reassured that the nurse in charge would not read the returned questionnaires. The investigator had information regarding the total number of HCNP in the center but did not know the names of staff members. Results of one research study (Dickinson et al., 1992) have shown that inviting subjects to complete questionnaires in their workplace produces a higher response rate, and most importantly, reduces selection bias as compared to asking subjects to return their questionnaire by mail. In Dickinson et al's study (1992), those subjects who returned their responses by mail experienced more back problems, suggesting that selection bias may have been a factor in their participation. Based on the findings of that study, the investigator continuously visited each center with the target of reaching a 80%-90% response rate. However, participation in the study was voluntary resulting in a 50% or lower response rate in some centers.

Treatment of Missing Data

Missing data were coded with three possible values: 777, 888 and 999. The code 777 was used for those data that were not applicable; 888 for those missing data where supplementary written information was provided by the participants; with the rest of the missing data coded as 999. No substitution of mean value was used to replace missing data. However in some situations ($\underline{n} < 20$), participants provided two answers to the same question. If there was a middle value between the two checks, the middle value was selected as the final answer. In addition, eight participants provided an answer between two values. In this situation, the decision criterion was based on flipping a coin. Most of missing values were left as missing, however and hence omitted from statistical analyses, which caused the sample size to vary slightly.

Data Analysis

Substruction of the current study variables is presented in Appendix H. This substruction was used to guide the data analysis process. Substruction is a process "whereby a researcher identifies the major variables in a study, analyzes the levels of abstraction among the variables, identifies hypothesized relationships between variables, and connects the theoretical basis of the study to the methodology" (Dulock & Holzemer, 1991, p. 83). The data analyses were conducted using version 10 of the Statistical Package for the Social Science (SPSS, 1999). Descriptive statistics, Cronbach's alpha, independent samples t-tests, Chi-square tests, the Pearson correlation coefficient, and multiple logistic regressions were used to test the hypotheses. Alpha was set to 0.05 for all hypothesis tests unless otherwise noted.

Descriptive statistics such as frequencies, means, standard deviations, and percentages were examined for all variables under study. In general, analyses were conducted on all participants, followed by a comparison between home care nursing personnel (HCNP) who worked in community nursing services (CNS) and those who worked in community psychiatric nursing services (CPNS). Then, a comparison between registered nurses (RNs) and enrolled nurses (ENs) who worked in CNS was performed as well. Since the independent variables under study comprised nominal, ordinal and continuous data, the Chi-square test was used to test the difference in proportions for nominal variables such as gender, education, and marital status, between HCNP working in CNS and CPNS. Moreover, independent samples t-tests was used to test differences for variables that were measured on ordinal scales, such as 5-point frequency Likert scales (i.e. 0 = almost never, and 5 = almost all the time), or for continuous variables, such as age, weight and height, between HCNP working in CNS and CPNS.

Bonferroni post-hoc pairwise comparisons were performed if there were differences in proportions between HCNP working in CNS and CPNS for nominal variables with more than 2 categories. For instance, overall Chi-square analysis showed that there were differences in proportions among managerial positions, registered nurses and enrolled nurses ($\chi^2 = 25.56$, $\underline{p} = .00$, Phi = .252, Cramer's V = .252). Three Bonferroni post-hoc pairwise comparisons were performed with Bonferroni adjusted level of 0.017 as the significance level (i.e. managerial positions versus registered nurses, managerial positions versus enrolled nurses, and registered nurses versus enrolled nurses).

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Following the descriptive analyses, bivariate statistical tests were used to estimate the correlation between the risk factors (e.g., personal, physical, and psychosocial) and the dependent dichotomous variable (i.e. back pain and work-related back pain). Comparisons between HCNP with back pain and HCNP without back pain were conducted using appropriate statistics. That is, the Chi-square tests were used for dichotomous versus nominal variables; and independent samples t-tests were used for dichotomous versus ordinal or continuous variables. Independent variables which showed a high degree of correlation with back pain were tested for multicollinearity. That is, if two variables were found to have a correlation equal to or higher than .80, only one variable would be selected to be entered into the final hierarchical multiple logistic regression analysis.

Based on the bivariate analysis and evaluation of multicollinearity, personal, physical, and psychosocial risk factors that correlated at least 0.20 (in absolute value) with either back pain or work-related back pain were considered for multiple logistic regression analysis. This criterion was selected because it represents 4% shared variance. Finally, pseudo R-square was used to interpret percentage of improvement in fit over a null model (Hosmer & Lemeshow, 2000).

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CHAPTER FOUR

RESULTS

Introduction

The results of the study will be presented in this chapter. First, a description of the study population will be presented, along with information regarding the response rate. Then, the reliability of the instrument will be discussed. Since the purpose of the study is to explore the prevalence of and risk factors for work-related back problems (WRBPs) among Home Care Nursing Personnel (HCNP) in Hong Kong (HK), the prevalence of musculoskeletal problems especially back problems will be described and then the functional outcomes due to back problems experienced by HCNP will be reviewed. Finally, the risk factors, such as personal, physical, and psychosocial, for WRBPs will be analyzed using different statistical tests, such as chi-square tests and independent samples t-tests. The overall risk factors for the back problems among HCNP in HK will then be presented based on the findings of the multiple logistic regression analysis.

Study Population

Response Rate

There are two streams of services for HCNP in HK: community nursing services (CNS) and community psychiatric nursing services (CPNS). The total population of 491 HCNP who worked under the Hospital Authority (HA) of HK during the period June through September 2003 were contacted regarding participation in this study. The potential number of participants for CNS was 377 and for CPNS was 114. A total of 411 HCNP returned a questionnaire, 310 HCNP from CNS and 101 from CPNS. Five

participants (two from CNS and three from CPNS) were excluded from data analysis because they did not answer most of the items in the questionnaire. Therefore, the overall response rate was 82.7%, while the response rate for CNS was 81.7% and for CPNS was 86.0%.

According to Dickinson and his colleagues (1992), a higher response rate can be attained if participants are asked to complete questionnaires in their workplace rather than by mail. Three related methods of recruitment were used in this study. About 8% (n = 38) of HCNP received their questionnaires via their charge nurse. The response rate for this method was 63.16%. Another group of HCNP (64%, n = 315) received their questionnaires via the investigator in a staff meeting; then the questionnaire was picked up by the investigator at a later time. The response rate for this method was 80.32%. The last group of HCNP (28%, n = 138) completed their questionnaires in their workplace after an explanation of the study was given by the investigator. This method yielded the highest response rate (97.10%) among the three methods. However, all three methods resulted in acceptable response rates.

The analysis of study variables was first conducted on all participants (i.e. CNS and CPNS), followed by an analysis of HCNP who worked in CNS and then of HCNP who worked in CPNS. Because the work that these two groups perform is substantially different, the purpose of the comparison between HCNP who worked in CNS and CPNS was to look for observed differences between these two groups among the variables under investigation. Likewise, because there might have also been differences between registered nurses (RNs) and enrolled nurses (ENs) with regard to job tasks, a comparison between these two groups was also made.

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Demographic Characteristics

All Participants

The majority of the participants were female (87%). Over two-thirds of the participants were married (70.9%); 27.1% (n = 108) had never been married; 1.8% (n = 7) were divorced or separated; and only 1 participant was widowed. Over half of the participants worked as registered nurses (n = 236, 58.9%), and 32.7% (n = 131) worked as enrolled nurses; only 34 participants (8.5%) worked in managerial positions (including. managers, nursing officers, and nursing specialists). Of the 265 registered nurses, 71% (n = 189) had a bachelor's degree, 27.92% (n = 74) were diploma graduates; and only 2 participants (<1%) had a Master's degree.

The mean age of the participants was 37.55 years (standard deviation [SD] = 7.08) and their ages ranged from 20 to 56 years. The mean height was 159.69 cm (SD = 7.33) and the mean weight was 54.25 kg (SD = 8.76). The mean number of years of nursing experience was 16.13 years (SD = 6.95) and their experience ranged from 1.5 to 36 years. The mean number of years spent in community nursing was 6.79 years (SD = 5.87) and their community experience ranged from < 1 year to 30 years. The mean monthly personal income reported by participants was HK$33,709.94 (SD = 7,901.44) with a range from HK$18,000 to HK$80,000. The mean monthly family income was HK$54,301.26 (SD = 24,481.36) and ranged from HK$18,000 to HK$170,000 (See Tables 3a and 3b).

Differences Between HCNP Working in CNS and CPNS

The analysis indicated that HCNP in CNS were younger, shorter and lighter. The HCNP in CNS had more community nursing experience, though they reported less monthly p

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monthly personal and family income. There were no differences in marital status between these groups. In addition, more men worked in CPNS, and those in CPNS reported a higher educational level (See Tables 3a, 3b, and 4 for further detailed analysis).

Tables 5a and 5b illustrate that nurses who worked in CPNS were more likely to work in managerial positions and be registered nurses than those in CNS positions. Furthermore, more registered nurses and those with a diploma or a bachelor's degree worked in CPNS than in CNS where more enrolled nurses were employed (See tables 6a and 6b for further detailed analysis).

Table 3a. Characteristics of total sample and comparison of CNS and CPNS participants with regard to demographic data (gender, position and education) (n = 406)

Characteristics	Total (N = 406)	CNS (N = 308)	CPNS (N = 98)	P-value
	n (%)	n (%)	n (%)	By χ^2
Gender				
Male	52 (13%)	12 (4%)	40 (40.8%)	.00 Phi = -.471 Cramer's V = .471
Female	349 (87%)	291 (96%)	58 (59.2%)	
Position				
Managerial position	34 (8.5%)	19 (6.3%)	15 (15.3%)	.00 Phi = .252 Cramer's V = .252
Registered nurse	236 (58.9%)	166 (54.8%)	70 (71.4%)	
Enrolled nurse	131 (32.7%)	118 (38.9%)	13 (13.3%)	
Education				
Master's degree	2 (0.51%)	1 (0.34%)	1 (1%)	.00 (excluded Master's degree category)
Bachelor of Science in nursing	189 (47.73%)	131 (43.96%)	58 (59.2%)	
Diploma in nursing	74 (18.69%)	49 (16.44%)	25 (25.5%)	
Enrolled nurse	131 (33.08%)	117 (39.26%)	14 (14.3%)	Phi = .23 Cramer's V = .23

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Table 3b. Characteristics of total sample and comparison of CNS and CPNS participants with regard to demographic data (age, height, weight, nursing experience, and income) (n = 406)

Characteristics	Total (N = 406) M ± SD (Range)	CNS (N = 308) M ± SD (Range)	CPNS (N = 98) M ± SD (Range)	By t-test
Age (years)	n = 371 35 ± 7.08 (20-56)	n = 278 37.11 ± 7.47 (20-56)	n = 93 38.85 ± 5.6 (26-53)	t = -2.36 df = 369 p = .02
Height (cm)	n = 391 159.69 ± 7.33 (130.05-198.9)	n = 295 158 ± 6.07 (130.05-183)	n = 96 164.85 ± 8.42 (145-198.9)	t = -7.36 df = 389 p = .000
Weight (kg)	n = 393 54.25 ± 8.76 (39-95)	n = 296 52.53 ± 7.26 (39-95)	n = 97 59.52 ± 10.68 (41.78-85)	t = -6.01 df = 391 p = .000
Community nursing experience (years)	n = 399 6.79 ± 5.87 (0-30)	n = 301 7.35 ± 6.14 (0-30)	n = 98 5.07 ± 4.56 (0.08-20)	t = 3.93 df = 397 p = .000
Monthly personal income (HK Dollar)	n = 352 33,709.94 ± 7901.44 (18,000-80,000)	n = 261 32,251.96 ± 7,645.03 (18,000-80,000)	n = 91 37,891.62 ± 7,127.2 (24,000-65,000)	t = -6.16 df = 350 p = .000
Monthly family income (HK Dollar)	n = 314 54,301.26 ± 24,481.36 (18,000-170,000)	n = 228 52,791.95 ± 25,056.35 (18,000-170,000)	n = 86 59,349.21 ± 22,358.6 (29,000-120,000)	t = -2.13 df = 312 p = .03

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Table 4. Comparison of CNS and CPNS participants by gender ($\underline{N} = 401$)

Services	Gender	
	Male	Female
Community Nursing (CNS)	12	291
Community Psychiatric (CPNS)	40	58

($\chi^2 = 89.13$, $\underline{p} = .00$, Phi = -.47, Cramer's V = .47)

Table 5a. Comparison of CNS and CPNS participants by position (registered nurses versus enrolled nurses) ($\underline{N} = 367$)

Services	Positions	
	Registered nurses	Enrolled nurses
Community Nursing (CNS)	166	118
Community Psychiatric (CPNS)	70	13

($\chi^2 = 18.75$, $\underline{p} = .00$, Phi = -.23, Cramer's V = .23)

Table 5b. Comparison of CNS and CPNS participants by position (managerial positions versus enrolled nurses) ($\underline{N} = 165$)

Services	Positions	
	Managerial nurses	Enrolled nurses
Community Nursing (CNS)	19	118
Community Psychiatric (CPNS)	15	13

($\chi^2 = 22.4$, $\underline{p} = .00$, Phi = -.37, Cramer's V = .37)

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Table 6a. Comparison of CNS and CPNS participants by educational backgrounds (enrolled nurses versus diploma in Nursing) (N = 205)

Services	Education: Enrolled nurse	Education: Diploma in nursing
Community Nursing (CNS)	117	49
Community Psychiatric (CPNS)	14	25

(χ^2 = 16.38, p = .00, Phi = .28, Cramer's V = .28)

Table 6b. Comparison of CNS and CPNS participants by educational backgrounds (enrolled nurses versus Bachelor of Science in nursing) (N = 320)

Services	Education: Enrolled nurse	Education: Bachelor of Science in nursing
Community Nursing (CNS)	117	131
Community Psychiatric (CPNS)	14	58

(χ^2 = 17.75, p = .00, Phi = .24, Cramer's V = .24)

Differences Between RNs and ENs Working in CNS

Participants who worked in CNS were comparable with regard to gender, height, weight, and marital status, but they differed on other characteristics. RNs in this setting were younger than their EN counterparts, had less nursing and community health experience, but reported higher monthly personal and family income (See table 7 for further detailed analysis).

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Table 7. Demographic characteristics of RNs and ENs who worked in CNS ($\underline{N}$ = 308)

Characteristics	Total CNS ($\underline{N}$ = 308) $\underline{M} \pm \underline{SD}$ (Range)	RNs ($\underline{N}$ = 166) $\underline{M} \pm \underline{SD}$ (Range)	ENs ($\underline{N}$ = 118) $\underline{M} \pm \underline{SD}$ (Range)	By t-test
Age (years)	$\underline{n}$ = 278 37.11 ± 7.47 (20-56)	$\underline{n}$ = 153 34.44 ± 6.13 (24-50)	$\underline{n}$ = 108 39.64 ± 7.57 (20-52)	$\underline{t}$ = -5.91 $\underline{df}$ = 259 $\underline{p}$ = .000
Nursing experience (years)	$\underline{n}$ = 303 15.75 ± 7.17 (1.5-36)	$\underline{n}$ = 166 13.01 ± 5.61 (1.5-30)	$\underline{n}$ = 118 18.23 ± 7.38 (5-32)	$\underline{t}$ = -6.46 $\underline{df}$ = 282 $\underline{p}$ = .000
Community nursing experience (years)	$\underline{n}$ = 301 7.35 ± 6.14 (0-30)	$\underline{n}$ = 164 4.34 ± 3.56 (0-23)	$\underline{n}$ = 118 10.63 ± 6.23 (1-25)	$\underline{t}$ = -9.88 $\underline{df}$ = 280 $\underline{p}$ = .000
Monthly personal income (HK Dollar)	$\underline{n}$ = 261 32,251.96 ± 7,645.03 (18,000-80,000)	$\underline{n}$ = 139 33,156.87 ± 6,192.95 (18,000- 80,000)	$\underline{n}$ = 103 28,038.19 ± 3,451.8 (18,000- 32,000)	$\underline{t}$ = 8.18 $\underline{df}$ = 240 $\underline{p}$ = .000
Monthly family income (HK Dollar)	$\underline{n}$ = 228 52,791.95 ± 25,056.35 (18,000- 170,000)	$\underline{n}$ = 123 55,018.1 ± 24,814.06 (18,000- 150,000)	$\underline{n}$ = 89 44,325.16 ± 17,985.28 (18,000- 130,000)	$\underline{t}$ = 3.64 $\underline{df}$ = 210 $\underline{p}$ = .000

Reliability of the Instrument

Validity and reliability determine the adequacy of an instrument (Polit & Hungler, 1995). The issue of validity for the Hong Kong Back Pain Questionnaire (HKBPQ) has been discussed in Chapter three under the topic of survey instrument. It is essential to discuss the reliability of the HKBPQ before presenting the dependent and independent variables of the study, because the reliability of the instrument determines the quality of the study data (Polit & Hungler, 1995).

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Cronbach's Alpha was used to test the internal consistency of the subscales (see Tables 8, 9, 10, and 11). The reliability of the HKBPQ is considered acceptable (results ranged from .51 to .95). In regard to the JCQ, the reliability coefficients for the subscales were comparable to those reported by Karasek and Theorell (1990) and Gillen (1996) except for decision authority and decision latitude of female participants, and skill discretion for both genders (See Tables 10 and 11). The discrepancy on the subscale of skill discretion seemed to be affected by one question asking if the participant's job involved a lot of repetitive work. According to the demand and control theory (Karasek & Theorell, 1990), a lack of repetitive work will contribute to a high level of skill discretion. However, in this sample of HCNP, more than 85% of them (including men and women) reported performing a lot of repetitive work, suggesting limited variability in this item for this sample. The relative lower reliability on the subscale of decision latitude could be affected by the repetitive work item and the other question asking the HCNP if they have a lot of say about what happens on their job. It is believed that a lot of say about what happens on the job will contribute a high level of decision authority and decision latitude. About 40% of them disagreed with the statement; hence, the responses of this item together with the repetitive work item mismatch the rest of 7 items and pull the overall reliability coefficients for decision authority and decision latitude down.

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Table 8. Results of Cronbach's Alpha (α) of five subscales: physical risk factors in the patients' homes, on the roads, and in the office, Nordic Musculoskeletal Questionnaire (NMQ), and interfering daily life (IDL)

	Physical Risk Factors				
	Patients' homes (15 items)	Roads (9 items)	Office (10 items)	NMQ	IDL
n	393	396	399	403	241
α	.94	.79	.64	.76	.95

Table 9. A comparison of reliability assessment (Cronbach's Alpha) of seven subscales of the Job Content Questionnaire (JCQ) on men, women, and both genders in current study (N = 401)

		Men		Women		Men and Women	
	# Items	n	α	n	α	n	α
Decision latitude	9	52	.76	343	.63	400	.65
Skill discretion	6	52	.65	344	.51	401	.53
Decision authority	3	52	.75	348	.62	405	.63
Psychological job demands	5	52	.64	341	.68	398	.68
Social support	8	52	.86	337	.80	394	.81
Psychological job demands (Framingham)	9	52	.72	335	.73	392	.74
Physical exertion (Framingham)	3	52	.69	345	.77	400	.78
Physical isometric loads	2	52	.93	347	.81	402	.84

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Table 10. A comparison of reliability assessment (Cronbach's Alpha) of seven subscales of the Job Content Questionnaire (JCQ) on women

		Karasek & Theorell (1990)		Current study	
	# Items	n	α	n	α
Decision latitude	9	1,557	.76	343	.63
Skill discretion	6	1,557	.71	344	.51
Decision authority	3	1,557	.70	348	.62
Psychological job demands	5	1,557	.61	341	.68
Social support	8	1,557	.81	337	.80
Psychological job demands (Framingham)	9	1,557		335	.73
Physical exertion (Framingham)	3	1,557		345	.77
Physical isometric loads	2	1,557		347	.81

Table 11. A comparison of reliability assessment (Cronbach's Alpha) of seven subscales of the Job Content Questionnaire (JCQ) on men

		Karasek & Theorell (1990)		Gillen (1996)		Current study	
	# Items	n	α	n	α	n	α
Decision latitude	9	2,946	.78	250	.72	52	.76
Skill discretion	6	2,946	.74	254	.57	52	.65
Decision authority	3	2,946	.70	251	.70	52	.75
Psychological job demands	5	2,946	.59	253	.68	52	.64
Social support	8	2,946	.83	249	.82	52	.86
Psychological job demands (Framingham)	9	2,946				52	.72
Physical exertion (Framingham)	3	2,946				52	.69
Physical isometric loads	2	2,946				52	.93

Prevalence of Musculoskeletal Problems

Participants were asked if they had pain in different parts of their body over the last 12-month period, including the neck, shoulders, upper back, lower back, elbows, wrists or hands, hips or thighs, knees, and ankles or feet. Participants who had less than one year of community nursing experience were excluded from analysis (n = 24) since a12-month prevalence was the variable of interest in this study. An additional 7 (1.7%) were also excluded from analysis due to missing data. Therefore, a total of 375 participants provided valid responses for this part of the study.

The analysis showed that participants reported bodily pain in the following areas, in descending order: shoulders (n = 274, 73.1%), knees (n = 244, 65.1%), neck (n = 236, 62.9%), lower back (n = 208, 55.5%), ankles or feet (n = 199, 53.4%), upper back (n = 191, 51.2%), wrists or hands (n = 113, 30.3%), hips or thighs (n = 103, 27.7%), and elbows (n = 65, 17.3%). However, when combining upper and lower back, the 12-month prevalence of back pain increased dramatically to 70.5% (n = 284) and it became the second most frequently reported bodily pain. Among them, 89.1% (n = 245) believed that their pain was caused or aggravated by work.

Nurses working in CNS reported a much higher prevalence of back pain and WRBP, the variables of interest, than those working in CPNS (See Table 12 for further analysis). But unexpectedly, for those in CNS, RNs had significantly more back pain than ENs (χ^2 = 7.49, p = .01, Phi = -.16, Cramer's V = .16), though the correlation was considered low (i.e. lower than the set criterion .20 for this study). However, there was no difference between groups with regard to work-related back pain.

Table 12. Comparison of 12-month prevalence of body part pain and services provided (i.e. CNS and CPNS) (N = 403)

Body parts in pain	Total (N = 403)	CNS (N = 305)	CPNS (N = 88)	P-value
	n (%)	n (%)	n (%)	By χ^2
Neck	n = 375	n = 287	n = 88	.009
Yes	236 (62.9%)	191 (66.6%)	45 (51.1%)	Phi = -.14
No	139 (37.1%)	96 (33.4%)	43 (48.9%)	Cramer's V = .14
Shoulders	n = 375	n = 287	n = 88	.000
Yes	274 (73.1%)	229 (79.8%)	45 (51.1%)	Phi = -.27
No	101 (26.9%)	58 (20.2%)	43 (48.9%)	Cramer's V = .27
Upper back	n = 373	n = 285	n = 88	.000
Yes	191 (51.2%)	161 (56.5%)	30 (34.1%)	Phi = -.19
No	182 (48.8%)	124 (43.5%)	58 (65.9%)	Cramer's V = .19
Lower back	n = 372	n = 284	n = 88	.000
Yes	208 (55.9%)	175 (61.6%)	33 (37.5%)	Phi = -.21
No	164 (44.1%)	109 (38.4%)	55 (62.5%)	Cramer's V = .21
Back	n = 403	n = 305	n = 98	.000
(upper & lower back)	284 (70.5%)	231 (75.7%)	53 (54.1%)	Phi = -.20
Yes	119 (29.5%)	74 (24.3%)	45 (45.9%)	Cramer's V = .20
No				
Work-related back pain	n = 394	n = 297	n = 97	.000
(upper & lower back)	245 (62.2%)	207 (69.7%)	38 (39.2%)	Phi = -.27
Yes	149 (37.8%)	90 (30.3%)	59 (60.8%)	Cramer's V = .27
No				
Elbows	n = 375	n = 287	n = 88	.02
Yes	65 (17.3%)	57 (19.9%)	8 (9.1%)	Phi = -.12
No	310 (82.7%)	230 (80.1%)	80 (90.9%)	Cramer's V = .12
Wrists or hands	n = 373	n = 287	n = 86	.02
Yes	113 (30.3%)	96 (33.4%)	17 (19.8%)	Phi = -.13
No	260 (69.7%)	191 (66.6%)	69 (80.2%)	Cramer's V = .13
Hips or thighs	n = 372	n = 285	n = 87	.16
Yes	103 (27.7%)	84 (29.5%)	19 (21.8%)	Phi = -.07
No	269 (72.3%)	201 (70.5%)	68 (78.2%)	Cramer's V = .07
Knees	n = 375	n = 287	n = 88	.11
Yes	244 (65.1%)	193 (67.2%)	51 (58%)	Phi = -.08
No	131 (34.9%)	94 (32.8%)	37 (42%)	Cramer's V = .08
Ankles or feet	n = 373	n = 286	n = 87	.4
Yes	199 (53.4%)	156 (54.5%)	43 (49.4%)	Phi = -.04
No	174 (46.6%)	130 (45.5%)	44 (40.6%)	Cramer's V = .04

Functional Outcomes

For those participants who experienced back pain, they were asked about work and daily activities that may have been affected by their pain (see Tables 13 and 14 for detailed analysis).

Severity of Back Pain

Among those participants who reported back pain (n = 284), more than 80% (n = 222) stated that they experienced back pain in the last 4 weeks, with accompanying slight to moderate severity (93.9%, n = 215). Moreover, more participants reported work-related back pain than non work-related back pain during the last 4 weeks (χ^2 = 21.22, p < .05, Phi = -.28, Cramer's V = .28). In general, the majority of respondents (71.9%, n = 199) felt a little to moderately distressed by their back pain; however, those who reported WRBP felt more distressed by their back pain (t = -4.57, df = 269, p < .01). Participants who worked in CNS felt their back pain was more severe and were more distressed by it than their counterparts in CPNS (see Table 13). In addition, ENs who worked in CNS perceived their back pain as more distressing than RNs (t = -2.17, df = 208, p < .05).

Effect on Work Life

Only about 20% (n = 53) indicated that back pain affected their work activities. In response to the question asking them how much their back problems interfered with their usual paid work, 40% (n = 101) of participants indicated a little to moderately affected; but more than half (56.5%, n = 135) stated it had no effect at all.

Number of sick or absent days due to back pain

Participants were asked to estimate the number of sickness or absence days that they had taken due to their back pain during the last 12 months. Although the mean number of sickness or absence days was low ($M = 0.37$, $SD = 1.69$), about one out of every ten HCNP had taken on sick leave (10.9%) and the number of days taken ranged from 1 to 21. For those who reported sick leave, the average number of days was 3.45 ($SD = 3.97$). Similar patterns of absence were found among participants regardless of their positions and services provided. However, one point worth mentioning is that a higher proportion of HCNP who worked in CPNS ($n = 8$, 15%) reported sick leave than those who worked in CNS ($n = 22$, 10%).

Table 13. Severity of back pain among HCNP who reported back pain and comparison of their functional outcomes between those working in CNS and CPNS (N= 284)

Severity of back pain	Total ($N = 284$)	CNS ($N = 231$)	CPNS ($N = 53$)	P-value
	$M \pm SD$ (Range)	$M \pm SD$ (Range)	$M \pm SD$ (Range)	By t-test
Severity of back pain in the last 4 weeks	$n = 229$ 0.55 ± 0.62 (0-3)	$n = 188$ 0.59 ± 0.64 (0-3)	$n = 41$ 0.37 ± 0.49 (0-1)	$t = 251$ $df = 227$ $p = 0.01$
Severity of back pain in general	$n = 277$ 1.19 ± 0.69 (0-3)	$n = 228$ 1.23 ± 0.71 (0-3)	$n = 52$ 1.02 ± 0.58 (0-2)	$t = 2.25$ $df = 278$ $p = 0.03$

Consultations with Health Care Practitioners

Participants were asked if they had seen any health care practitioners because of their back pain during the last 12 months. If so, they were asked to indicate how many visits they had had with the health practitioners. Among the 284 participants who

reported back pain, 34.5% (n = 98) stated that they had consulted health care practitioners. They reported that the number of visits to doctors ranged from 1 to 5, while visits to physiotherapists or chiropractors ranged from 1 to 20.

Effect on Daily Life

About 50% (n = 129) of participants reported that back pain affected their leisure activities, but only 20% of them indicated back pain affected their work activities. Although almost all of the participants (80%) reported that their back pain interfered little with their daily life, about 20% of the participants experienced a moderate to extreme degree of interference from their back pain which affected their work at home, their sleep and rest, and leisure and recreational activities. Results showed that there were no differences among the HCNP with regard to severity of pain, number of sick days taken, and consultation with health care practitioners, but there were differences with regard to the degree to which back pain interfered with their lives. Participants who reported work-related back pain felt their back pain interfered with their work at home more than those who reported non work-related back pain (t = -3.32, df = 230, p < .01). In addition, the HCNP who worked in CNS felt their back pain interfered more with their daily life than those in CPNS due to increased stiffness and pain, as well as feeling that they were becoming more dependent on others (See Table 14).

Table 14. The degree to which back pain interfered in daily life of participants who reported back pain and their comparison between those who worked in CNS and CPNS (N = 284)

Variables	Total (N = 284) M ± SD (Range)	CNS (N = 231) M ± SD (Range)	CPNS (N = 53) M ± SD (Range)	P-value By t-test
The use of back	n = 240 1.22 ± 0.88 (0-4)	n = 198 1.29 ± 0.89 (0-4)	n = 42 0.86 ± 0.75 (0-3)	t = 3.30 df = 238 p = .002
The work at home	n = 241 1.03 ± 0.92 (0-4)	n = 199 1.09 ± 0.94 (0-4)	n = 42 0.76 ± 0.73 (0-3)	t = 2.13 df = 239 p = .04
Bathing, dressing, toileting, or other personal care	n = 241 0.54 ± 0.76 (0-4)	n = 199 0.59 ± 0.79 (0-4)	n = 42 0.26 ± 0.54 (0-2)	t = 3.28 df = 239 p = .002
Sleep and rest	n = 241 0.93 ± 0.89 (0-4)	n = 199 0.94 ± 0.90 (0-4)	n = 42 0.88 ± 0.86 (0-4)	t = 0.42 df = 239 p = .68
Leisure or recreational activities	n = 241 0.90 ± 0.90 (0-4)	n = 199 0.96 ± 0.93 (0-4)	n = 42 0.57 ± 0.63 (0-2)	t = 2.61 df = 239 p = .01
Activities so that they became dependent on others	n = 241 0.37 ± 0.65 (0-4)	n = 198 0.43 ± 0.69 (0-4)	n = 42 0.01 ± 0.26 (0-1)	t = 5.63 df = 238 p = .000
Activities due to stiffness and pain	n = 241 0.86 ± 0.81 (0-4)	n = 198 0.91 ± 0.84 (0-4)	n = 42 0.60 ± 0.63 (0-2)	t = 2.34 df = 238 p = .02

Risk Factors for Back Problems

Descriptive Analysis of HCNP Jobs

Work-related Physical factors

1. Number of clients visited and time spent on different work areas

All participants (n = 406) were full-time staff and they worked 44 hours per week, the typical number of hours worked per week in HK. On average, they worked 8.7 hours (SD = 1.47, Median [Mdn] = 8.50) on the last day that they worked. It is not an usual practice in HK to pay overtime hours, but the participants used holiday compensation for their overtime hours (about 13 minutes per week, SD = 0.65). However, on average, the participants worked 3.14 (SD = 3.62) unpaid hours per week with no holiday compensation for these overtime hours.

On average, the HCNP visited 7.75 clients per day (SD = 4.09). They spent 3.35 hours (SD =1.46) in patients' homes/nursing homes, 1.11 hours (SD = 0.60) on the road, 3.23 (SD = 1.77) in the office, 44.4 minutes (SD = 16.8) on lunch/tea break, and 15 minutes (SD = 36.6) on other work activities. When the reported hours spent on each activity is added, the average number of hours worked totals 8.65 hours (SD = 1.38) on the last working day, which approximates the number of hours worked (i.e. 8.7 hours) that participants reported on the last day that they worked, thus providing a measure of validity to these self reports.

The amount of time that participants spent in different activities, such as time on the road or office, was comparable, regardless of which type of service that they provided (See Table 15). However, they differed on other characteristics. Participants working in CNS visited more clients, spent more time in the clients' homes or nursing homes, and

spent less time on lunch and tea break than those in CPNS. No differences were found between how RNs and ENs working in CNS spent their working hours.

Table 15. Number of clients visited and time spent on different areas by HCNP on the last working day (N = 406)

Characteristics	Total (N = 406)	CNS (N = 308)	CPNS (N = 98)	P-value
	M ± SD (Range)	M ± SD (Range)	M ± SD (Range)	By t-test
Number of clients visited	n = 402 7.75 ± 4.09 (0-25)	n = 305 9.12 ± 3.53 (0-25)	n = 97 3.46 ± 2.44 (0-13)	t = 17.70 df = 400 p = .000
Time spent in clients' homes/nursing homes	n = 400 3.35 ± 1.46 (0-7.75)	n = 304 3.66 ± 1.31 (0-7.75)	n = 96 2.37 ± 1.49 (0-6.5)	t = 8.11 df = 398 p = .000
Time spent on the road	n = 389 1.11 ± 0.60 (0-4)	n = 292 1.08 ± 0.54 (0-4)	n = 97 1.19 ± 0.77 (0-3.5)	t = -1.30 df = 387 p = .020
Time spent in the office	n = 397 3.23 ± 1.77 (0-10)	n = 300 3.15 ± 1.59 (0.25-10)	n = 97 3.51 ± 2.21 (0-8.5)	t = -1.50 df = 395 p = .14
Time spent on lunch/tea break	n = 401 0.74 ± 0.28 (0-1)	n = 304 0.70 ± 0.28 (0-1)	n = 97 0.88 ± 0.25 (0-1)	t = -6.08 df = 399 p = .000
Time spent on other activities	n = 401 0.25 ± 0.61 (0-5)	n = 304 0.21 ± 0.52 (0-3.5)	n = 97 0.40 ± 0.81 (0-5)	t = -2.22 df = 399 p = .03
Total work time	n = 387 8.65 ± 1.38 (2.75-15.5)	n = 291 8.77 ± 1.34 (4-15.5)	n = 96 8.29 ± 1.45 (2.75-12)	t = 3.01 df = 385 p = .003

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2. Number of clients visited who used walking devices

Because mobility can be one indicator of patient needs, participants were asked to note how many patients used assistive devices during their home visits on the last day that they worked. On average, the number of clients using canes was 1.28 (SD = 1.71), using walkers was 0.77 (SD = 1.21), and using wheelchairs was 2.32 (SD = 3.09). As would be expected, HCNP working in CNS visited significantly more clients using canes ($t = 14.74$, $df = 403$, $p < .01$), walkers ($t = 12.23$, $df = 403$, $p < .01$) and wheelchairs ($t = 16.45$, $df = 403$, $p < .01$) than their counterparts in CPNS. Again, however, no such differences were found between RNs and ENs working in CNS.

3. Frequency and duration of time spent on nursing procedures

Participants were asked to indicate the frequency and total duration of time spent on nursing procedures that they performed on their last working day (See Tables 16 and 17 for detailed analysis). Only six nursing procedures were performed more frequently than once per day. The descending ranking of these nursing procedures most frequently performed to those least frequently performed was as follows: simple assessment (M= 4.21, SD = 3.88, range 0 to 20); wound care or drain care (M = 3.98, SD = 3.74, range 0 to 18); health education (M = 3.26, SD = 3.46, range 0 to 20); measuring vital signs (M = 3.05, SD = 3.88, range 0 to 20); drug administration and supervision (M = 1.97, SD = 1.95, range 0 to 11); and comprehensive assessment (M = 1.30, SD = 2.29, range 0 to 20). Most nursing procedures were performed for less than 10 minutes per day; however, those procedures that were more frequently performed, as well as counselling, often had a total duration greater than 10 minutes per day. Among them, wound care occupied most of their time with a mean time of 55.21 minutes per day (SD = 54.70).

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Comparisons between CNS and CPNS demonstrate that the daily tasks performed by each specialty differ (See Table 16). As would be expected, CNS performed activities that reflected more physical care, while CPNS tasks were more counselling-oriented. Participants who worked in CNS were more likely than their CPNS counterparts to spend more time performing wound care, simple assessment, health education, diabetic care, measuring vital signs, caring for feeding tubes or urinary catheters, and collecting and testing specimens. However, CPNS nurses were more likely to perform counselling than their counterparts in CNS.

In general, RNs and ENs working in CNS performed a comparable number of nursing procedures that took approximately the same amount of time to perform, despite their differences in education and training.

Table 16. Frequency of nursing procedures performed by HCNP on the last working day and by job title (N = 406)

Characteristics	Total (N = 406)	CNS (N = 308)	CPNS (N = 98)	
	M ± SD (Range)	M ± SD (Range)	M ± SD (Range)	By t-test
Comprehensive assessment	n = 400 1.30 ± 2.29 (0-20)	n = 305 1.27 ± 2.40 (0-20)	n = 95 1.42 ± 1.89 (0-7)	t = 0.57 df = 398 p = .57
Simple assessment	n = 400 4.21 ± 3.88 (0-20)	n = 304 4.99 ± 4.01 (0-20)	n = 96 1.73 ± 2.00 (0-8)	t = 10.60 df = 398 p = .000
Drug administration and supervision	n = 400 1.97 ± 1.95 (0-11)	n = 304 1.69 ± 1.69 (0-10)	n = 96 2.83 ± 2.40 (0-11)	t = -4.33 df = 398 p = .000
Specimen collection and testing	n = 403 0.30 ± 0.82 (0-5)	n = 306 0.39 ± 0.92 (0-5)	n = 97 0.00 ± 0.00 (0-0)	t = 7.42 df = 401 p = .000
Counselling	n = 399 1.21 ± 2.10 (0-16)	n = 306 0.71 ± 1.80 (0-16)	n = 93 2.87 ± 2.18 (0-10)	t = -8.69 df = 397 p = .000
Health education	n = 398 3.26 ± 3.46 (0-20)	n = 303 3.65 ± 3.75 (0-20)	n = 95 2.02 ± 1.82 (0-7)	t = 5.71 df = 396 p = .000
Wound care/drain care	n = 399 3.98 ± 3.74 (0-18)	n = 302 5.26 ± 3.43 (0-18)	n = 97 0.00 ± 0.00 (0-0)	t = 26.65 df = 397 p = .000
Feeding tube care	n = 402 0.59 ± 0.95 (0-6)	n = 305 0.73 ± 1.03 (0-6)	n = 97 0.00 ± 0.00 (0-0)	t = 12.47 df = 400 p = 0.000
Urinary catheter care	n = 401 0.48 ± 0.82 (0-5)	n = 304 0.63 ± 0.88 (0-5)	n = 97 0.00 ± 0.00 (0-0)	t = 12.50 df = 399 p = .000
Diabetic care	n = 401 0.57 ± 0.98 (0-5)	n = 304 0.75 ± 1.07 (0-5)	n = 97 0.001 ± 0.10 (0-1)	t = 11.86 df = 399 p = .000
Measuring vital signs	n = 403 3.05 ± 3.88 (0-20)	n = 306 4.02 ± 4.00 (0-20)	n = 97 0.00 ± 0.00 (0-0)	t = 17.58 df = 401 p = .000

Table 17. Duration (minutes) of nursing procedures performed by HCNP on the last working day and by job title (N = 406)

Characteristics	Total (N = 406) M ± SD (Range)	CNS (N = 308) M ± SD (Range)	CPNS (N = 98) M ± SD (Range)	P-value By t-test
Comprehensive assessment	n = 400 25.91 ± 41.51 (0-270)	n = 305 23.17 ± 36.03 (0-207)	n = 94 34.79 ± 55.01 (0-270)	t = -1.92 df = 397 p = .06
Simple assessment	n = 394 25.06 ± 31.74 (0-300)	n = 299 26.88 ± 31.94 (0-300)	n = 95 19.33 ± 30.54 (0-240)	t = 2.03 df = 392 p = .04
Drug administration and supervision	n = 395 21.99 ± 31.72 (0-480)	n = 299 20.69 ± 33.51 (0-480)	n = 96 26.05 ± 25.06 (0-100)	t = -1.44 df = 393 p = .15
Specimen collection and testing	n = 402 2.39 ± 7.33 (0-75)	n = 305 3.14 ± 8.27 (0-75)	n = 97 0.00 ± 0.00 (0-0)	t = 6.64 df = 400 p = .000
Counselling	n = 399 14.64 ± 31.42 (0-300)	n = 305 5.12 ± 10.92 (0-80)	n = 94 45.53 ± 50.73 (0-300)	t = -7.67 df = 397 p = .000
Health education	n = 389 20.99 ± 25.26 (0-225)	n = 296 21.56 ± 26.52 (0-225)	n = 93 19.16 ± 20.80 (0-120)	t = 0.80 df = 397 p = .43
Wound care/drain care	n = 396 55.21 ± 54.70 (0-300)	n = 299 73.12 ± 51.49 (0-300)	n = 97 0.00 ± 0.00 (0-0)	t = 24.55 df = 394 p = .000
Feeding tube care	n = 402 7.95 ± 14.31 (0-110)	n = 305 10.47 ± 15.61 (0-110)	n = 97 0.00 ± 0.00 (0-0)	t = 11.72 df = 400 p = .000
Urinary catheter care	n = 397 7.83 ± 14.08 (0-80)	n = 300 10.36 ± 15.38 (0-80)	n = 97 0.00 ± 0.00 (0-0)	t = 11.67 df = 395 p = .000
Diabetic care	n = 397 5.95 ± 10.93 (0-60)	n = 300 7.84 ± 11.96 (0-60)	n = 97 0.10 ± 1.02 (0-10)	t = 11.07 df = 395 p = .000
Measuring vital signs	n = 400 11.88 ± 20.20 (0-200)	n = 303 15.69 ± 21.89 (0-200)	n = 97 0.00 ± 0.00 (0-0)	t = 12.47 df = 398 p = .000

4. Frequency of performing patient lifting or transferring activities

Unlike their counterparts in other countries such as the United States, Canada, Sweden, and the Netherlands (Brulin et al., 1998; Cheung, 1999; Knibbe & Friele, 1996; Myers et al., 1993), HCNP in HK, on average, performed 2 or less patient lifting or transferring activities per day (See Table 18). Those who worked in CPNS hardly performed any of those activities. The most frequent activities reported by HCNP on their last day of work in CNS were: repositioning or pulling up a patient in bed (M = 2.80, SD = 2.82, range 0 to 11); manipulating extremities (M = 2.39, SD = 2.92, range 0 to 11); and transferring a patient more than 100 lbs (M = 1.48, SD = 2.48, range 0 to 11).

Table 18. Frequency of patient lifting or transferring activities that the HCNP performed on the last working day (N = 406)

Characteristics	Total (N = 406) M ± SD (Range)	CNS (N = 308) M ± SD (Range)	CPNS (N = 98) M ± SD (Range)	P-value By t-test
Reposition or pull up a patient in bed	n = 405 2.13 ± 2.73 (0-11)	n = 308 2.80 ± 2.82 (0-11)	n = 97 0.003 ± 0.23 (0-2)	t = 17.02 df = 403 p = .000
Reposition or pull up a patient in a wheelchair/chair	n = 405 0.80 ± 1.48 (0-11)	n = 308 1.05 ± 1.61 (0-11)	n = 97 0.00 ± 0.00 (0-0)	t = 11.37 df = 403 p = .000
Transfer a patient in and out of bed	n = 405 0.38 ± 0.97 (0-11)	n = 308 0.48 ± 1.08 (0-11)	n = 97 0.003 ± 0.23 (0-2)	t = 6.87 df = 403 p = .000
Transfer a patient in and out of a wheelchair/chair	n = 405 0.30 ± 0.90 (0-10)	n = 308 0.39 ± 1.01 (0-10)	n = 97 0.001 ± 0.10 (0-1)	t = 6.52 df = 403 p = .000
Transfer a patient in and out of a bathroom	n = 405 0.003 ± 0.31 (0-5)	n = 308 0.004 ± 0.35 (0-5)	n = 97 0.00 ± 0.00 (0-0)	t = 2.09 df = 403 p = .04
Transfer a patient on and off the toilet	n = 405 0.004 ± 0.32 (0-5)	n = 308 0.01 ± 0.36 (0-5)	n = 97 0.001 ± 0.10 (0-1)	t = 1.95 df = 403 p = .05
Dress or feed a patient	n = 405 0.17 ± 0.85 (0-10)	n = 308 0.23 ± 0.97 (0-10)	n = 97 0.00 ± 0.00 (0-0)	t = 4.10 df = 403 p = .000
Manipulate extremities	n = 405 1.82 ± 2.75 (0-11)	n = 308 2.39 ± 2.92 (0-11)	n = 97 0.00 ± 0.00 (0-0)	t = 14.35 df = 403 p = .000
Transfer a patient more than 100 lbs	n = 405 1.13 ± 2.25 (0-11)	n = 308 1.48 ± 2.48 (0-11)	n = 97 0.003 ± 0.23 (0-2)	t = 10.10 df = 403 p = .000
Reposition/move/pull up a patient more than 100 lbs	n = 405 1.09 ± 2.14 (0-11)	n = 308 1.43 ± 2.36 (0-11)	n = 97 0.003 ± 0.23 (0-2)	t = 10.23 df = 403 p = .000

5. Frequency on performing manual lifting activities in upright or bent postures

Besides asking the participants about their manual lifting activities, investigators also asked participants how often they performed lifting, pushing, pulling or carrying using light force (up to 25lbs), moderate force (25-50lbs), and strong force (more than 50lbs) with their trunk in an upright posture as well as in a bent posture. The response categories were in a 4-point Likert scale format (0 = never, 1 = seldom, 2 = sometimes, 3 = often and 4 = very often). As would be expected, HCNP in CNS lifted, pushed, pulled, or carried light, moderate and strong force in an upright or bent postures more often than those who worked in CPNS (See Tables 19 and 20 for detailed results). RNs and ENs who worked in CNS demonstrated similar patterns with regard to the frequency of performing manual lifting activities in an upright or a bent posture. That is, more than 60% of the participants at least sometimes lifted, pushed, pulled or carried light force with their trunk in an upright or a bent posture. However, more than 60% of participants never or seldom lifted, pushed, pulled or carried moderate force, and more than 70% of participants never or seldom lifted, pushed, pulled or carried using strong force.

Table 19. Frequency of performing manual lifting activities in an upright posture on the last working day among HCNP (N = 406)

Characteristics	Total (N = 406)	CNS (N = 308)	CPNS (N = 98)	P-value
	M ± SD (Range)	M ± SD (Range)	M ± SD (Range)	By t-test
Light force	n = 389 2.30 ± 1.37 (0-4)	n = 292 2.57 ± 1.22 (0-4)	n = 97 1.47 ± 1.46 (0-4)	t = 6.67 df = 387 p = .000
Moderate force	n = 354 1.19 ± 1.12 (0-4)	n = 264 1.46 ± 1.09 (0-4)	n = 90 0.38 ± 0.73 (0-4)	t = 10.63 df = 352 p = .000
Strong force	n = 340 0.71 ± 0.86 (0-4)	n = 251 0.88 ± 0.88 (0-4)	n = 89 0.21 ± 0.59 (0-4)	t = 8.01 df = 338 p = .000

Table 20. Frequency of performing manual lifting activities in a bent position on the last working day among HCNP (N = 406)

Characteristics	Total (N = 406)	CNS (N = 308)	CPNS (N = 98)	P-value
	M ± SD (Range)	M ± SD (Range)	M ± SD (Range)	By t-test
Light force	n = 386 1.84 ± 1.29 (0-4)	n = 289 2.20 ± 1.16 (0-4)	n = 97 0.76 ± 1.05 (0-4)	t = 10.80 df = 384 p = .000
Moderate force	n = 355 1.03 ± 1.05 (0-4)	n = 265 1.31 ± 1.05 (0-4)	n = 90 0.22 ± 0.47 (0-2)	t = 13.32 df = 353 p = .000
Strong force	n = 343 0.76 ± 0.97 (0-4)	n = 254 0.97 ± 1.03 (0-4)	n = 89 0.16 ± 0.37 (0-1)	t = 10.84 df = 341 p = .000

6. Time spent on patients' homes or nursing homes

Participants were asked about their time spent performing activities with patients that were potentially physically harmful to the back or other body parts. The response format used a 5-point Likert scale (0 = almost never, 1 = about 10% of the time, 2 = about 25% of the time, 3 = about half of the time, 4 = about 75% of the time, and 5 = almost all the time). Table 21 illustrates the detailed analysis of the responses to these questions. In summary, results showed that HCNP who worked in CNS spent significantly more time performing each physically risky activity than their counterparts in CPNS. These findings were consistent with the results found using the mean score of all responses on these questions for each participant ($t = 21.34$, $df = 389$, $p < .01$). More than 50% of participants who worked in CNS spent 25% or more of their time walking, in prolonged bending at a 45^0 angle, and working in limited spaces. Once again, however, there were no differences between RNs and ENs who worked in CNS with regard to time spent on these activities.

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Table 21. Time spent in performing activities in patients' homes on the last working day among HCNP (N = 406) using a 6-point frequent scale from almost never to almost all of the time

Characteristics	Total (N = 406) M ± SD (Range)	CNS (N = 308) M ± SD (Range)	CPNS (N = 98) M ± SD (Range)	P-value By t-test
Pushing/pulling loads	n = 385 1.16 ± 1.43 (0-5)	n = 291 1.51 ± 1.48 (0-5)	n = 94 0.01 ± 0.30 (0-1)	t = 15.39 df = 383 p = .000
Lifting/carrying objects	n = 390 1.87 ± 1.72 (0-5)	n = 295 2.32 ± 1.68 (0-5)	n = 95 0.48 ± 0.93 (0-5)	t = 13.43 df = 388 p = .000
Walking	n = 390 2.28 ± 1.73 (0-5)	n = 295 2.65 ± 1.68 (0-5)	n = 95 1.11 ± 2.29 (0-5)	t = 9.40 df = 388 p = .000
Climbing stairs	n = 381 1.22 ± 1.31 (0-5)	n = 287 1.43 ± 1.38 (0-5)	n = 94 0.56 ± 0.77 (0-5)	t = 7.63 df = 379 p = .000
Unadjustable height	n = 391 1.90 ± 1.79 (0-5)	n = 296 2.48 ± 1.67 (0-5)	n = 95 0.01 ± 0.24 (0-1)	t = 24.15 df = 389 p = .000
Limited working spaces	n = 390 2.04 ± 1.75 (0-5)	n = 295 2.55 ± 1.64 (0-5)	n = 95 0.44 ± 0.88 (0-5)	t = 15.99 df = 388 p = .000
Insufficient lifting or transferring devices	n = 388 1.57 ± 1.69 (0-5)	n = 294 2.03 ± 1.67 (0-5)	n = 94 0.12 ± 0.57 (0-5)	t = 16.88 df = 386 p = .000
Bent 45° for prolonged period	n = 393 1.95 ± 1.67 (0-5)	n = 298 2.50 ± 1.52 (0-5)	n = 95 0.24 ± 0.65 (0-4)	t = 20.48 df = 391 p = .000
Bent 75° for prolonged periods	n = 392 1.11 ± 1.35 (0-5)	n = 297 1.45 ± 1.38 (0-5)	n = 95 0.01 ± 0.22 (0-1)	t = 16.80 df = 390 p = .000
Prolonged twisting or rotation	n = 389 1.21 ± 1.55 (0-5)	n = 294 1.55 ± 1.62 (0-5)	n = 95 0.15 ± 0.46 (0-3)	t = 13.34 df = 387 p = .000
Prolonged bending to the side	n = 388 0.92 ± 1.33 (0-5)	n = 293 1.17 ± 1.41 (0-5)	n = 95 0.14 ± 0.52 (0-4)	t = 10.60 df = 386 p = .000
Prolonged squatting	n = 390 0.98 ± 1.30 (0-5)	n = 295 1.25 ± 1.36 (0-5)	n = 95 0.17 ± 0.54 (0-4)	t = 11.18 df = 388 p = .000

7. Time spent on the road

Besides working in patients' homes or nursing homes, HCNP also spent time travelling on the road. They often carried a heavy nursing bag while walking and climbing stairs. Consistently, HCNP who worked in CNS spent significantly more time performing physically risky activities on the road than their counterparts in CPNS except riding in motor vehicles. Both RNs and ENs who worked in CNS reported similar amounts of time spent on these on-the-road activities (See Table 22).

Table 22. Time spent in performing activities while on the road on the last working day among HCNP (N = 406) using a 6-point frequent scale from almost never to almost all of the time

Characteristics	Total (N = 406)	CNS (N = 308)	CPNS (N = 98)	P-value
	M ± SD (Range)	M ± SD (Range)	M ± SD (Range)	By t-test
Pushing/pulling loads	n = 389 0.84 ± 1.49 (0-5)	n = 294 1.10 ± 1.63 (0-5)	n = 95 0.01 ± 0.24 (0-1)	t = 10.48 df = 387 p = .000
Lifting/carrying objects	n = 393 2.90 ± 2.01 (0-5)	n = 298 3.28 ± 1.83 (0-5)	n = 95 1.72 ± 2.10 (0-5)	t = 6.50 df = 391 p = .000
Sitting	n = 392 1.51 ± 1.25 (0-5)	n = 297 1.40 ± 1.22 (0-5)	n = 95 1.85 ± 1.29 (0-4)	t = -2.99 df = 390 p = .000
Standing	n = 391 2.16 ± 1.51 (0-5)	n = 296 2.37 ± 1.55 (0-5)	n = 95 1.49 ± 1.12 (0-5)	t = 6.00 df = 389 p = .000
Walking	n = 392 2.94 ± 1.58 (0-5)	n = 295 3.27 ± 1.54 (0-5)	n = 97 1.92 ± 1.24 (0-5)	t = 8.78 df = 390 p = .000
Climbing stairs	n = 394 1.29 ± 1.23 (0-5)	n = 297 1.44 ± 1.26 (0-5)	n = 97 0.84 ± 1.00 (0-5)	t = 4.83 df = 392 p = .000
Slippery or uneven surfaces	n = 396 1.08 ± 1.37 (0-5)	n = 299 1.26 ± 1.42 (0-5)	n = 97 0.54 ± 1.04 (0-5)	t = 5.39 df = 394 p = .000
Riding in motor vehicles	n = 396 1.77 ± 1.25 (0-5)	n = 298 1.74 ± 1.25 (0-5)	n = 98 1.85 ± 1.24 (0-5)	t = -0.75 df = 394 p = .46
Prolonged or sustained posture	n = 393 1.17 ± 1.35 (0-5)	n = 296 1.41 ± 1.41 (0-5)	n = 97 0.45 ± 0.83 (0-4)	t = 8.10 df = 391 p = .000
Mean score on variables measured on the road	n = 395 1.74 ± 0.89 (0-5)	n = 298 1.92 ± 0.88 (0-5)	n = 97 1.19 ± 0.69 (0-3.22)	t = 7.44 df = 393 p = .000

8. Time spent in the office

Certain office tasks such as sitting, or lifting, can contribute to the development of work-related pain if the exposures are prolonged or repetitive. To that end, participants were also asked about their time spent in activities that were identified *a priori* as potentially contributing to the back pain. Although the time spent in the office was about 3 hours (See Table 15), over 40% (n = 164) of them reported sitting 70% or more of the time while in the office and about 18% (n = 74) of participants spent 50% or more of their time in limited working spaces. Unlike findings regarding work in the patients' homes or on the road, no differences were identified in nurses based on their service setting.

Non-work-related physical factors.

Participants were asked about their work at home to ascertain if additional physical stressors were correlated with occurrence of back pain. Because women traditionally tend to do more housework than men (Messias, Im et al., 1997; Messias, Regev et al., 1997; Steenland, 2000), it was theorized that women might be exposed to additional physical stressors during off-hours work. Participants reported that 44% of their domestic work was performed by HCNP themselves, about one third (33.8%) was done by maids, and slightly less than one third (30.6%) was performed by spouses. Although it would be expected that males would work less at home, and given that 40% of the CPNS nurses are male, both groups equally reported having to work at home. Despite these added burdens, more than 60% (n = 245) did not feel their domestic work was hectic. Although there were differences in income, no difference in performance of domestic work was demonstrated between CNS and CPNS, nor did they have different

levels of either child care or adult dependent care at home. One hundred and seventy-nine (44.5%) participants reported that they had no child care, and over 80% ($n = 335$) participants had no elder or disability care. For those that reported ($n = 223$) providing child care, the mean number of children that they had was 1.69 ($SD = 0.64$, Mdn = mode = 2). On the other hand, only 67 participants reported that they needed to provide elder or disability care, and the mean number of older dependent adults who needed care was 1.46 ($SD = 1.08$, Mdn = mode = 1). However, ENs who worked in the CNS setting reported a higher number of children at home needing child care than compared to RNs ($t = -0.31$, $df = 281$, $p < .01$).

Work-related Psychosocial Factors

The Job Content Questionnaire (JCQ) was used to measure psychosocial factors that might contribute to job stress leading to the development of musculoskeletal problems. Twelve domains of the JCQ were measured. Scores for the subscales were calculated using the instructions provided by the developers of the instrument.

The HCNP who worked in CPNS had significantly higher decision latitude scores than those who worked in CNS. On the other hand, HCNP in CNS had significantly higher physical exertion and physical exertion (Framingham) scores, as well as physical isometric loads than their counterparts in CPNS (see Table 23). Among those working in CNS, RNs had significantly higher scores than those working as ENs in the following domains: skill discretion ($t = 3.71$, $df = 279$, $p < .01$), created skill ($t = 3.58$, $df = 281$, $p < .01$), and psychological job demands (Framingham) ($t = 4.31$, $df = 269$, $p < .01$).

Table 23. Job content subscale scores and comparisons of subscale scores between HCNP working in CNS and CPNS (N = 406)

Characteristics	Total (N = 406)	CNS (N = 308)	CPNS (N = 98)	P-value
(Range)	M ± SD (Range)	M ± SD (Range)	M ± SD (Range)	By t-test
Skill discretion (12-56)	n = 401 35.30 ± 3.69 (24-46)	n = 304 35.13 ± 3.63 (26-44)	n = 97 35.81 ± 3.84 (24-46)	t = -1.59 df = 399 p = .11
Decision authority (12-48)	n = 405 33.04 ± 5.72 (16-48)	n = 307 32.76 ± 5.67 (16-48)	n = 98 33.92 ± 5.81 (20-48)	t = -1.76 df = 403 p = .08
Decision latitude (24-104)	n = 400 68.37 ± 7.86 (46-94)	n = 303 67.90 ± 7.78 (48-90)	n = 97 69.84 ± 7.99 (46-94)	t = -2.11 df = 398 p = .04
Psychological job demands (12-48)	n = 398 35.30 ± 4.70 (24-48)	n = 300 35.25 ± 4.51 (25-48)	n = 98 35.48 ± 5.26 (24-48)	t = -0.43 df = 396 p = .67
Coworker support (4-16)	n = 400 11.61 ± 1.42 (5-16)	n = 303 11.57 ± 1.42 (5-16)	n = 97 11.73 ± 1.41 (8-16)	t = -0.97 df = 398 p = .33
Supervisor support (4-16)	n = 399 10.90 ± 1.92 (4-16)	n = 301 10.83 ± 1.90 (4-16)	n = 98 11.10 ± 1.97 (4-16)	t = -1.22 df = 397 p = .22
Physical exertion (1-4)	n = 404 2.96 ± 0.67 (1-4)	n = 307 3.10 ± 0.61 (2-4)	n = 97 2.51 ± 0.68 (1-4)	t = 7.77 df = 402 p = .000
Physical exertion (Framingham) (3-12)	n = 400 8.06 ± 1.70 (3-12)	n = 303 8.57 ± 1.46 (4-12)	n = 97 6.48 ± 1.42 (3-10)	t = 12.29 df = 398 p = .000
Physical isometric loads (2-8)	n = 402 4.94 ± 1.37 (2-8)	n = 306 5.31 ± 1.24 (2-8)	n = 96 3.75 ± 1.04 (2-6)	t = 12.29 df = 400 p = .000
Psychological job demands (Framingham) (3-21)	n = 392 10.05 ± 3.11 (3-20)	n = 295 10.08 ± 2.96 (4-20)	n = 97 9.95 ± 3.53 (3-19)	t = 0.33 df = 390 p = .74

Bivariate Analysis

Following the descriptive analyses of physical, psychosocial and personal risk factors for back problems, bivariate statistical tests were conducted to determine the correlation between each risk factor and the dependent dichotomous variables (i.e. back pain and work-related back pain). In the situation where independent variables were nominal, the chi-square test was used to test the difference in proportion for participants who had back pain and those who did not have back pain. On the other hand, in the situations where the independent variables were either ordinal or continuous, the independent samples t-test was used to test the difference between the group mean of those participants with back pain and those who did not have back pain. Independent variables that showed a .20 or greater correlation with back pain were tested for multicollinearity within the risk factor domains, i.e. personal, physical and psychosocial.

As would be expected, HCNP who had back pain reported being exposed more frequently to certain personal, physical and psychosocial risk factors than those who reported no back pain in the last 12 months. See Tables 24a – 26 for detailed analysis.

Personal Factors

The analysis showed that HCNP suffering from work-related back pain were more likely to be females ($\chi^2 = 14.62$, $df = 1$, $p < .01$) who worked in the CNS setting ($\chi^2 = 16.72$, $df = 1$, $p < .01$). Although participants suffering from back pain, regardless of whether the pain was work-related or not, were more likely to be younger ($t = -2.92$, $df = 367$, $p < .01$), however, the strength of the correlation between age and dependent variables was lower than .20.

Work-related Physical Factors

Participants who reported work-related back pain more often repositioned a patient in bed ($t = -4.77$, $df = 391$, $p < .01$), and lifted, pushed, pulled or carried a moderate force in an upright posture ($t = -3.90$, $df = 342$, $p < .01$), or a light force in a bent position ($t = -4.50$, $df = 373$, $p < .01$). As expected, HCNP with back pain, regardless of whether or not it was work-related, spent more time working in ergonomically unfavourable home environments, having to work in awkward postures (see Table 24a). Moreover, HCNP who reported work-related back pain frequently worked in a position of prolonged twisting or rotation ($t = -4.93$, $df = 376$, $p < .01$) and prolonged bending to the side ($t = -4.06$, $df = 374$, $p < .01$) during the time they were in patients' homes.

While on the road, HCNP with back pain, regardless of whether or not it was work-related, spent more time lifting or carrying objects (see Table 24b). Moreover, those who reported work-related back pain frequently engaged in walking ($t = -4.13$, $df = 378$, $p < .01$), pushing or pulling loads ($t = -4.88$, $df = 375$, $p < .01$), and prolonged or sustained postures ($t = -4.18$, $df = 379$, $p < .01$).

When they were in the office, HCNP with back pain, regardless of whether or not it was work-related, spent more time in prolonged or sustained postures (See Table 24b). Since the mean scores for each "worksite" were significantly related to back pain and work-related back pain (See Tables 24a and 24b), they were used for multiple logistic regression analyses rather than the individual items in each "worksite".

Besides the physical risk factors in each "worksite", HCNP who reported back pain and work-related back pain experienced more physical exertion (Framingham) and sustained greater physical isometric loads as measured by the JCQ (See Table 24c).

Table 24a. Comparison of HCNP who had back pain and HCNP who did not have back pain on work-related physical factors (in patients' homes) (N = 402)

Characteristics	HCNP with back pain (N = 284)	HCNP without back pain (N = 119)	P-value
	M ± SD	M ± SD	By t-test
In patients' homes or nursing homes			
Working from an unadjustable height	n = 273 2.13 ± 1.78	n = 115 1.30 ± 1.66	t = -4.31 df = 386 p = .000
Working in limited working spaces	n = 272 2.28 ± 1.74	n = 115 1.39 ± 1.57	t = -4.74 df = 385 p = .000
Working without sufficient lifting or transferring devices	n = 272 1.76 ± 1.70	n = 113 1.04 ± 1.55	t = -3.89 df = 383 p = .000
Bend 45° for prolonged periods	n = 275 2.21 ± 1.62	n = 115 1.30 ± 1.59	t = -5.12 df = 388 p = .000
Bend 75° for prolonged periods	n = 275 1.33 ± 1.39	n = 114 0.58 ± 1.05	t = -5.18 df = 387 p = .000
Prolonged kneeling	n = 273 0.49 ± 0.87	n = 114 0.14 ± 0.40	t = -5.48 df = 385 p = .000
Mean score on variables measured in the patients' homes	n = 274 1.53 ± 1.07	n = 114 1.01 ± 1.04	t = -4.43 df = 386 p = .000

Table 24b. Comparison of HCNP who had back pain and HCNP who did not have back pain on work-related physical factors (on the road and in the office) (N = 402)

Characteristics	HCNP with back pain (N = 284)	HCNP without back pain (N = 119)	P-value
	M ± SD	M ± SD	By t-test
On the road			
Lifting or carrying objects	n = 277 3.16 ± 1.93	n = 113 2.25 ± 2.07	t = -4.01 df = 388 p = 0.000
Mean score on variables measured on the road	n = 277 1.84 ± 0.88	n = 115 1.46 ± 0.84	t = -3.98 df = 390 p = .000
In the office			
Prolonged or sustained position	n = 277 1.08 ± 1.37	n = 117 0.49 ± 0.94	t = -4.90 df = 392 p = .000
Mean score on variables measured in the office	n = 279 0.99 ± 0.48	n = 117 0.75 ± 0.46	t = -4.46 df = 394 p = .000

Table 24c. Comparison of HCNP who had back pain and HCNP who did not have back pain on JCQ (N = 399)

Characteristics	HCNP with back pain (N = 284)	HCNP without back pain (N = 119)	P-value
	M ± SD	M ± SD	By t-test
Physical exertion (Framingham)	n = 282 8.33 ± 1.63	n = 115 7.38 ± 1.71	t = -5.19 df = 395 p = .000
Physical isometric loads	n = 283 5.18 ± 1.34	n = 116 4.56 ± 1.26	t = -5.77 df = 397 p = .000

Non-work-related Physical Factors

The review of literature showed that having children at home could reduce HCNP's chance of having low back pain (Brulin et al., 1998). However, interestingly, in HK similar results were found only if a maid was hired to take care of the domestic work. The result in block 1 of the hierarchical multiple logistic regression (See Table 25) shows that children at home would not reduce the possibility of having back pain; however, this was adjusted for having a maid at home, having a child did reduce the chance of having back pain.

Table 25. Hierarchical multiple logistic regression predicting back pain among HCNP, beta, standard error (SE), odds ratio (OR), and 95% confidence interval (CI) for non-work-related physical factors (N = 402)

Variables	**Beta**	**SE**	**Wald**	**OR**	**95%CI**
Block 1					
Children at home	-0.42	0.23	3.48	0.66	0.42 – 1.02
Block 2					
Children at home	-0.65	0.26	6.50	0.52	0.31 – 0.86
Maid	0.51	0.27	3.58	1.66	0.98 – 2.80

Work-related Psychosocial Factors

Participants who reported back pain and work-related back pain not only were exposed to personal and physical risk factors, they also were exposed to psychosocial risk factors. Participants with work-related back pain reported higher psychological job demands (Framingham) than their counterparts (t = -4.30, df = 380, p < .01). Nine items make up the psychological job demands subscale (See Table 26). Participants who had back pain felt that their work was very hectic, reported that their tasks were often interrupted and they more often had to wait on work from other people before their job

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could be completed. On the other hand, participants who did not have back pain more often reported that they had enough time to get their job done and that they were not asked to do an excessive amount of work.

Table 26. Comparison of HCNP who had back pain and HCNP who did not have back pain on psychological job demands (N = 402)

Characteristics	HCNP with back pain (N = 284) M ± SD	HCNP without back pain (N = 119) M ± SD	P-value By t-test
My job requires working very fast	n = 282 3.16 ± 0.57	n = 119 3.07 ± 0.56	t = -1.43 df = 399 p = .15
My job requires working very hard	n = 283 3.31 ± 0.50	n = 119 3.25 ± 0.47	t = -1.19 df = 400 p = .24
I am not asked to do an excessive amount of work	n = 283 2.25 ± 0.66	n = 119 2.44 ± 0.62	t = 2.57 df = 400 p = .01
I have enough time to get the job done	n = 283 2.24 ± 0.65	n = 119 2.40 ± 0.60	t = 2.40 df = 400 p = .02
I am free from conflicting demands that others make	n = 282 2.38 ± 0.63	n = 118 2.47 ± 0.62	t = 1.31 df = 398 p = .19
My job requires long periods of intense concentration on the task	n = 283 3.05 ± 0.58	n = 118 2.97 ± 0.49	t = -1.32 df = 399 p = .19
My tasks are often interrupted before they can be completed, requiring attention at a later time	n = 282 2.64 ± 0.69	n = 119 2.49 ± 0.55	t = -2.32 df = 399 p = .02
My job is very hectic	n = 283 2.50 ± 0.63	n = 119 2.26 ± 0.60	t = -3.56 df = 400 p = .000
Waiting on work from other people or departments often slows me down on my job	n = 283 2.65 ± 0.66	n = 119 2.39 ± 0.56	t = -3.90 df = 400 p = .000

Multicollinearilty

Correlations among the variables within each risk factor domain, i.e. personal, physical, and psychosocial, showed no evidence of multicollinearity (i.e. $\underline{r} \geq .80$).

Multiple Logistic Regressions

Based on the bivariate analysis and evaluation of multicollinearity, personal, physical, and psychosocial risk factors that demonstrated a significant correlation with back pain were considered for inclusion in a hierarchical multiple logistic regression analysis of reported back pain. Multiple logistic regression analyses with incremental adjustment for potential confounders were performed to identify the predictors for back pain and work-related back pain, as well as the potential confounders (See Tables 27 and 28).

Results showed that physical risk factors in the office, physical isometric loads, and psychological job demands (Framingham) were significant predictors for both back pain and work-related back pain among HCNP in HK (See Tables 27 and 28). However, a complex relationship was determined to exist between having children and hiring a maid in this sample, in that those who both had children and a maid demonstrated decreased odds ratio (OR = 0.49, 95% CI = 0.25 – 0.92) (See Table 27) of having back pain. However, this complex relationship disappeared in predicting work-related back pain. In addition, there was little effect of which services that the HCNP provided in predicting back pain or work-related back pain when adjusting for the other 9 predictors.

Table 27. Associations between personal, physical, psychosocial, and domestic work factors and 12 month prevalence of back pain among HCNP: results from multiple logistic regression with incremental adjustment for potential confounders (N =402)

Variables	Crude Odds Ratio (OR) (95% CI)	OR adjusted for age and gender (95% CI)	OR adjusted for age, gender and physical[a] factors (95% CI)	OR adjusted for age, gender, physical[a] and psychosocial[b] factors (95% CI)	OR adjusted for age, gender, physical[a] psychosocial[b], and domestic work[c] factors (95% CI)	OR adjusted for age, gender, physical[a], psychosocial[b], domestic work[c] factors, and type of service[d] (95% CI)
Age (1 year)	**0.95 (0.92-0.99)**	0.96 (0.93-1.00)	0.99 (0.94-1.02)	0.99 (0.95-1.03)	1.00 (0.96-1.04)	1.00 (0.96-1.04)
Female Gender	**3.07 (1.70-5.57)**	**3.52 (1.85-6.71)**	**2.25 (1.08-4.66)**	2.11 (1.00-4.42)	2.08 (0.98-4.39)	1.75 (0.78-3.91)
Physical risk factors in patients' homes	**1.66 (1.31-2.10)**	**1.70 (1.30-2.23)**	1.08 (0.71-1.64)	1.12 (0.73-1.71)	1.11 (0.72-1.70)	0.99 (0.62-1.57)
Physical risk factors on the roads	**1.71 (1.30-2.26)**	**1.66 (1.22-2.25)**	0.95 (0.59-1.54)	0.95 (0.59-1.55)	0.94 (0.57-1.54)	0.97 (0.59-1.60)
Physical risk factors in the office	**3.40 (1.93-5.97)**	**2.88 (1.58-5.26)**	**2.53 (1.17-5.45)**	**2.50 (1.16-5.41)**	**2.73 (1.25-5.92)**	**2.86 (1.31-6.24)**
Physical exertion (Framingham)	**1.41 (1.23-1.62)**	**1.33 (1.14-1.54)**	1.10 (0.89-1.36)	1.04 (0.84-1.30)	1.05 (0.84-1.31)	1.01 (0.80-1.27)
Physical isometric loads	**1.61 (1.35-1.93)**	**1.57 (1.28-1.91)**	**1.34 (1.02-1.77)**	**1.37 (1.04-1.82)**	**1.41 (1.06-1.88)**	**1.39 (1.05-1.86)**
Psychological job demands (Framingham)	**1.16 (1.07-1.25)**	**1.12 (1.04-1.22)**	**1.11 (1.01-1.21)**	**1.11 (1.01-1.21)**	**1.10 (1.01-1.21)**	**1.12 (1.02-1.23)**
Children at home	0.65 (0.42-1.01)	0.81 (0.50-1.31)	0.65 (0.38-1.11)	0.62 (0.36-1.08)	**0.5 (0.26-0.95)**	**0.49 (0.25-0.92)**
Maid at home	1.21 (0.77-1.92)	1.15 (0.71-1.86)	1.25 (0.72-2.15)	1.09 (0.62-1.90)	1.56 (0.82-3.00)	1.67 (0.86-3.24)
Service (CPNS)[d]	**0.38 (0.23-0.61)**	**0.45 (0.26-0.79)**	0.87 (0.41-1.86)	0.68 (0.30-1.51)	0.60 (0.26-1.37)	0.60 (0.26-1.37)

Note: **Bold** represents significant results

(a) physical factors include physical risk factors in patients' homes, on the roads, in the office, physical exertion (Framingham), physical isometric loads
(b) Psychosocial factors include psychological job demands (Framingham)
(c) Domestic work factors include children at home and maid at home
(d) Community psychiatric nursing services (CPNS) compared with community nursing services (CNS)

Table28. Associations between personal, physical, psychosocial, and domestic work factors and 12 month prevalence of work-related back pain among HCNP: results from multiple logistic regression with incremental adjustment for potential confounders (N =402)

Variables	Crude Odds Ratio (OR) (95% CI)	OR adjusted for age and gender (95% CI)	OR adjusted for age, gender and physical[a] factors (95% CI)	OR adjusted for age, gender, physical[a] and psychosocial[b] factors (95% CI)	OR adjusted for age, gender, physical[a] psychosocial[b], and domestic work[c] factors (95% CI)	OR adjusted for age, gender, physical[a], psychosocial[b], domestic work[c] factors, and type of service[d] (95% CI)
Age (1 year)	**0.95** **(0.92-0.98)**	0.96 (0.93-0.99)	0.99 (0.96-1.03)	1.00 (0.96-1.03)	1.01 (0.97-1.05)	1.00 (0.96-1.05)
Female Gender	**4.19** **(2.25-7.81)**	**3.95** **(2.07-7.54)**	**2.35** **(1.10-4.99)**	**2.22** **(1.03-4.79)**	1.97 (0.90-4.29)	1.59 (0.67-3.68)
Physical risk factors in patients' homes	**1.84** **(1.47-2.32)**	**1.82** **(1.40-2.36)**	1.05 (0.70-1.58)	1.07 (0.71-1.61)	1.05 (0.69-1.59)	0.91 (0.58-1.42)
Physical risk factors on the roads	**2.11** **(1.60-2.79)**	**1.92** **(1.41-2.61)**	1.13 (0.71-1.80)	1.06 (0.66-1.72)	1.05 (0.65-1.71)	1.10 (0.68-1.80)
Physical risk factors in the office	**3.75** **(2.19-6.43)**	**3.03** **(1.71-5.39)**	**2.09** **(1.02-4.29)**	**2.26** **(1.08-4.71)**	**2.34** **(1.11-4.91)**	**2.49** **(1.17-5.27)**
Physical exertion (Framingham)	**1.61** **(1.40-1.87)**	**1.47** **(1.26-1.72)**	1.23 (1.00-1.51)	1.19 (0.95-1.48)	1.19 (0.95-1.49)	1.13 (0.90-1.43)
Physical isometric loads	**1.84** **(1.53-2.20)**	**1.72** **(1.41-2.10)**	**1.37** **(1.05-1.80)**	**1.42** **(1.08-1.87)**	**1.48** **(1.11-1.96)**	**1.45** **(1.09-1.93)**
Psychological job demands (Framingham)	**1.17** **(1.08-1.26)**	**1.13** **(1.05-1.22)**	**1.11** **(1.01-1.21)**	**1.12** **(1.01-1.21)**	**1.12** **(1.02-1.22)**	**1.13** **(1.03-1.24)**
Children at home	0.73 (0.48-1.10)	0.86 (0.54-1.35)	0.71 (0.42-1.21)	0.68 (0.39-1.18)	0.63 (0.33-1.18)	0.60 (0.31-1.14)
Maid at home	1.13 (0.74-1.74)	1.05 (0.66-1.67)	1.11 (0.65-1.89)	0.96 (0.55-1.66)	1.19 (0.63-2.26)	1.30 (0.68-2.51)
Service (CPNS)[d]	**0.28** **(0.17-0.45)**	**0.35** **(0.20-0.60)**	0.69 (0.32-1.45)	0.52 (0.24-1.16)	0.51 (0.23-1.16)	0.51 (0.23-1.16)

Note: **Bold** represents significant results

(a) physical factors include physical risk factors in patients' homes, on the roads, in the office, physical exertion (Framingham), physical isometric loads
(b) Psychosocial factors include psychological job demands (Framingham)
(c) Domestic work factors include children at home and maid at home
(d) Community psychiatric nursing services (CPNS) compared with community nursing services (CNS)

CHAPTER FIVE

DISCUSSION

Introduction

The results shown in Chapter Four confirm a high prevalence of work-related back problems (WRBPs) among home care nursing personnel (HCNP) in Hong Kong (HK). Moreover, the severity of the back pain as perceived by the HCNP ranged from slight to moderate. Referring to the conceptual framework for this study shown in Appendix B, the physical risk factors identified are office work and static postures; the psychosocial risk factors are psychological job demands (Framingham); and the personal risk factors are age, gender, and types of services provided.

This chapter will first focus on interpreting the findings of the study, presented in previous chapter. The interpretation will be in the context of the objectives of the study: (a) to determine the prevalence of WRBPs among HCNP in HK; (b) to determine the functional outcomes of WRBPs among HCNP in HK; (c) to determine the risk factors (including physical, psychosocial, and personal) for WRBPs among HCNP in HK; and (d) to compare the differences among HCNP (i.e., nurses working in community nursing services [CNS] versus those working in community psychiatric nursing services [CPNS]; and registered nurses [RNs]versus enrolled nurses [ENs]). Following the discussion of the study's findings, the strengths and limitations of this study will be identified. Finally, the implications for nursing and recommendations for future research are proposed.

Prevalence of Back Problems

The 12-month prevalence of back pain problems (including both the regions of the upper and lower back) among HCNP in HK was 70.5% (n = 245). Among them, 89.1% (n = 245) believed that their pain was caused or aggravated by work. As this is the first cross-sectional study on problems with back pain among this particular population, i.e. RNs and ENs who work in CNS and CPNS, no previous study can be used for comparison. In other words, the results found in this study can serve as a baseline for comparison for future studies.

As mentioned earlier in Chapter One, HCNP in HK provide two major types of services: CNS and CPNS. HCNP working in CNS provide nursing care and treatment for patients in the patients' homes, while HCNP working in CPNS provide psychological counselling and crisis interventions for patients (Hospital Authority, 2004a, 2004b). The results of the study demonstrated that although both groups work in the community, HCNP working in CNS performed activities that reflected the more physical nature of care, including tasks such as wound care, measuring vital signs, urinary catheter care, feeding tube care, and diabetic care. HCNP working in CPNS, however, focused on counselling-oriented procedures. Perhaps because of the differences in the nature of the tasks performed by these groups, the 12-month prevalence of back pain problems differed substantially between these groups as well. The results of the study showed that the 12-month prevalence was significantly higher with HCNP working in CNS (75.5%, n = 231) than with their counterparts in CPNS (54.1%, n = 53) (OR = 2.65, 95% CI = 1.65 – 4.27). Physical work demands have been well documented as risk factors for back problems among nursing personnel (Owen & Staehler, 2003; Yip, 2001); the results of this study

add yet another piece of evidence regarding the contribution of physical work loads to WRBPs.

Besides examining the influence of different services on the prevalence of problems with back pain, this study also involves HCNP whose educational background differs although they may share the same job title, i.e., RNs and ENs. Many published studies on HCNP have concentrated on back problems among nursing aides (NAs) (Brulin, Gerdle, Granlund, Hoog, Knutson, & Sundelin, 1998; Johansson, 1995; Meyer & Muntaner, 1999; Myers, Jensen, Nestor, & Rattiner, 1993). This is likely because surveillance activities and research have both demonstrated that NAs are at a higher risk of developing back problems as compared to other care-giving occupations (BLS, 1999; Jensen, 1987). In reviewing the injury data from the Bureau of Labor Statistics' Supplementary Data System in the United States, Jensen (1987) found that NAs had the greatest incidence ratio for disabling back problems among the following occupations, ranked in decreasing order of risk: construction laborers, garbage collectors, licensed practical nurses (LPNs), and RNs. It is believed that NAs provide more physical care to patients than RNs and LPNs, and hence have greater exposure to risky tasks. In addition, NAs who work in home care settings suffer from more back injuries than their counterparts in hospital settings (Myers et al., 1993; U.S. Department of Labor, 1997).

However, unexpectedly, one study conducted by Knibbe and Friele (1996) in the Netherlands found that the 12-month prevalence of back pain for NAs (61.2%) was significantly lower than that for RNs (71.4%). This finding contradicts the results of most studies conducted in the United States. Since no NAs are employed in HK home care, the target population for the present study involved only RNs and ENs. The results

showed that the 12-month prevalence of back problems for RNs and ENs was 72.2% ($\underline{n}$ = 169) and 64.6% ($\underline{n}$ = 84) respectively, a non-statistically significant difference ($\chi^2 = 2.28$, $p = 0.13$). Given that RNs and ENs provide similar kinds of nursing care to patients, these results are not surprising. Although the RNs in this sample have more education than the ENs, the ENs are older and have more nursing and community nursing experience than the RNs. The healthy worker effect might be a factor in the lower prevalence of back problems with regard to the ENs. Moreover, it is important to note that the 12-month prevalence of back pain problems for RNs working in both CNS and CPNS in the present study was similar to the findings of Knibbe and Friele.

Since there was a significant difference between HCNP who work in CNS and CPNS with regard to the prevalence of back pain, a further comparison was made between RNs and ENs within these two services. Within CNS, the 12-month prevalence of back pain problems was significantly higher in RNs (81.7%, $\underline{n}$ = 134) than in ENs (67.5%, $\underline{n}$ = 79) ($\chi^2 = 7.49$, $p = .01$). Within CPNS, the 12-month prevalence percentage was slightly higher in RNs (50%, $\underline{n}$ = 35) than in ENs (38.5%, $\underline{n}$ = 5), but this difference was not significant ($\chi^2 = 0.59$, $p = 0.45$). In this study, psychological job demands and risk factors for back pain in office settings predicted back pain. These factors could possibly be relevant here, since RNs perform more managerial and supervisory tasks than ENs. These tasks also result in more time spent in the office. These issues will be discussed in greater depth in a later section. It is assumed that the RNs in Knibbe and Friele's (1996) study were working in settings similar to the CNS setting in Hong Kong, rather than in a CPNS setting, given their description of the job tasks performed by RNs. If this assumption is true, the 12-month prevalence of back pain problems among RNs in

HK (81.7%, n = 134) has been demonstrated to be higher than their counterparts in the Netherlands (71.4%, n = 135) ($\chi^2 = 5.12$, $p = 0.02$). The reasons for this are unclear, although they could be related to the work tasks themselves, or to the work or home environment.

Prevalence of Other Musculoskeletal Problems

Besides assessing the prevalence of back pain problems in this sample, the 12-month prevalence of pain in other parts of the body was also analyzed. Although not necessarily the focus of this dissertation, it deserves attention because of the alarmingly high self-reported prevalence of pain in many areas. As a matter of fact, pain in the shoulder (73.1%, n = 274) presented the highest prevalence percentage of all parts of the body. More than 50% of the subjects reported a 12-month prevalence of pain in the following areas of the body: neck, shoulders, upper back, lower back, knees, and ankles or feet. Less than 50% mentioned pain in their wrists or hands, hips or thighs, and elbows. The prevalence of pain in the wrists or hands and elbows were 30.3% and 17.3% respectively. During site visits of the community nursing offices, it was noted that many of the workstations were not comfortable or ergonomically designed. This may prove to be more problematic for nurses in the community because of the increasing use of computers in these settings. The results of one comparison study conducted by Johansson (1995) in Sweden showed that psychological workloads increase neck and shoulder problems while poor postures increase low back problems. In the present study, both psychological job demands and physical isometric loads were identified as risk factors for back pain problems. If it is true that psychological demands increase neck and shoulder problems, it is possible that measures aimed at preventing back problems for

HCNP in HK could potentially lead to a reduction in other musculoskeletal problems, such as shoulder and neck pain.

The other unique musculoskeletal problem found in HCNP in HK is knee pain. In a local study conducted by Chung et al. (2000) with HCNP working in CNS, the 12-month prevalence of knee pain was 65% (n = 158). The results of the present study (67.2%, n = 193) supported Chung et al.'s study (2000). The similar results of these two studies confirm that HCNP in HK have a significantly higher prevalence of knee problems than their counterparts in the Netherlands (18%, n = 64) (Knibbe & Friele, 1996) and in the United States (5%, n = 19) (Meyer & Muntaner, 1999). It is possible that the means of transportation used by HCNP to travel from one patient to another could account for some of this difference. Most likely, HCNP in Western countries use cars for transportation while HCNP in HK walk due to the short distances between clients. In this study, when HCNP were asked to state the possible causes for their musculoskeletal problems, walking while carrying a heavy nursing bag, was repeatedly mentioned. Chung and colleagues (2000) found that walking up stairs 30 to 45 minutes a day was a risk factor for knee pain in HCNP (OR = 5.20, 95% CI = 1.68 – 16.11). Strategies to reduce the amount of risky walking exposure for HCNP should be investigated. Managers in one centre encouraged HCNP to take taxis as a group to nearby neighborhoods to reduce the amount of walking they had to do and to reduce the strain on their shoulders from carrying a heavy nursing bag. Some nurses have suggested storing supplies in patients' homes to reduce the weight of the nursing bag.

Undoubtedly, the 12-month prevalence of back pain is high among HCNP in HK, especially among those working in CNS. One might argue that this high prevalence

would be an underestimate due to the recall bias, since the participants had to recall what had happened in the last 12 months. In fact, of those who stated that they had experienced back pain in the past 12 months, more than 80% (n = 222) indicated that they had felt back pain in the last four weeks. Clearly, there is a need for preventive interventions aimed at reducing the prevalence of back pain.

Functional Outcomes of Back Problems

In general, the HCNP who had back pain felt a little-to-moderately distressed by their back pain. Interestingly, the HCNP who worked in CNS felt their back pain to be more distressing and severe than did their counterparts in CPNS. Unexpectedly, although RNs working in CNS reported a higher prevalence of back pain than ENs, ENs were more distressed by their back pain than RNs. There are many possible explanations for this observation. Several that might be relevant to this sample are as follows: first, ENs are generally older than RNs. Although being a RN is not a predictor for back pain (OR = 0.12, 95% CI = 0.88 – 3.05), with a similar physical workload, ENs who are older might become fatigued more easily than their younger counterparts. Fatigue has been identified as one of the risk factors for back problems (Kumar, 1990). Second, besides being older than the RNs, ENs also had more children to care for at home than did the RNs (χ^2 = 11.40, p = 0.001). Although the RNs had higher monthly and family incomes than the ENs, income had no influence on the hiring of a maid at home for both RNs and ENs. Having a maid at home might reduce the chance of developing back pain (OR = 0.49, 95% CI = 0.25 – 0.92), but might not help to reduce pain of those who already suffered from it.

Another interesting observation from this sample is that back pain seems to have affected leisure activities more than work activities. About 50% of HCNP who had back pain reported that back pain affected their leisure activities, but only about 20% indicated that back pain affected their work activities. Paid work is an essential component of life. This is especially true in HK, where the cost of living is very high. The results of one study conducted in Mainland China found that the greatest concern for Chinese people was the possibility of becoming embroiled in an economic crisis (Xie, Wang, & Xu, 2003). Although it is unknown whether or not HK Chinese people share these same fears, Hong Kong is currently experiencing a high rate of unemployment and high degree of downsizing. In addition, the culture of nursing might also play an important role in the downplaying by nurses of the effect of back pain on their work. In their study conducted in the Netherlands, Knibbe and Friele (1996) found that more than 90% of HCNP chose to continue to work despite suffering from back pain. As they stated, "Nurses do not take pain very seriously and sometimes consider it [back pain] inherent to the profession" (Knibbe & Friele, 1996, p. 196). It is possible that this same phenomenon might also occur with HCNP in HK; hence, their back pain did not seem to affect their work activities.

It had been anticipated that back pain would have affected work activities more than leisure activities because Hong Kong has some of the longest working hours of any major international city. In general, the usual number of working hours per year ranges from 2,200-2,500, while in the United States the usual number of working hours is 2,000 annually (International Labour Organization [ILO], 1999). The official number of working hours for most HK working persons, including HCNP, is 44 hours per week,

which is much higher than in some European countries such as France, where the average is 35 hours per week (ILO, 1999). In addition, HCNP are expected to work four hours on alternate Saturdays. Because of the long working hours, lack of time is the major barrier to participating in recreation and sporting activities (Fu, 1997; Lam, 1998). Fu (1997) conducted a study to investigate the leisure activities in which HK people would participate. The results showed that shopping and watching television were the most popular leisure activities. In addition, people in HK preferred to engage in leisure activities in and around the home and in social recreation, followed by sports and physical recreation. The majority of the respondents in Fu's study (1997) believed that recreation and sports were important or very important, and that the main reason for participation was to be physically strong. HCNP, being health care professionals, are most likely aware of the importance to their health and well being of engaging in leisure and recreational activities. However, integrating exercise into one's daily routine may be difficult when the working hours are so protracted.

Office Work

Unexpectedly, office work predicted back pain in this sample, while the a priori theory was that the physically exerting work in patient's homes would have been more likely to be a risk factor for back pain. On average, HCNP in HK spend 3.35 hours in the homes of patients, 1.11 hours on the road, and 3.23 hours in the office. They only take breaks during lunch time. Officially, HCNP are provided with one hour for lunch; however, the average length of the lunch break in this sample was 0.74 hours. Nurses working in CNS visited more patients and spent more time in the patients' homes, but spent less time on lunch than those in CPNS. However, there was no difference between

the groups with regard to the number of hours spent in the office. Studies have found that rotating jobs and taking breaks can be effective strategies for reducing musculoskeletal disorders (Department of Labor, 1999; NIOSH, 1997; Ortiz-Hernandez, 2003; Yassi, 2000). Rotating jobs with different physical demands reduces the stress put on limbs and regions of the body, while scheduling breaks allows a person to rest and recover (NIOSH, 1997).

On the macroscopic level, HCNP rotate their tasks constantly because of the nature of their jobs. They either walk to the homes of patients or take public transportation. Then, for approximately 15 minutes per visit, they perform nursing procedures as needed in the patients' homes. They then go on the road again to visit other patients. Hence, although they walk while carrying a heavy nursing bag, the physical demands on the body are periodically shifted. They would most likely put down their nursing bag while in a patient's home, giving their shoulders a break. If they are able to maintain a proper posture, or vary their body positions, they would also be able to give their back a rest or to give it some support. However, if they need to bend or twist their back because of limited space, adequate rest may not be possible. In a similar vein, if nurses can find a seat on the bus or can perform certain nursing procedures while sitting, their knees or legs will have an opportunity to recover. This is a possible explanation for why physical risk factors in patients' homes and on the road were not found to be predictors for back pain among HCNP.

On the contrary, work in the office is relatively constant, compared to work performed in the homes of patients and on the road. Nurses stay in the office for approximately three hours while charting or making phone calls to patients. Most of the

time, they are in a sitting position, which has been identified as a risk factor for back pain (Westgaad, Warsted, Jansen, & Aaras, 1986). They may need to use computers to perform data entry. One study conducted in Mexico by Ortiz-Hernandez and his colleagues (2003) found that computer use led to increases in problems with the hand, back, and upper extremities. Owing to the rapid growth in information technology, the use of computers has increased in all industrial settings, including the health care sector. The Occupational Safety and Health (Display Screen Equipment [DSE]) Regulation came into operation in HK on July 4, 2003. Under this regulation, employers have the responsibility of providing necessary safety and health training in the use of DSE workstations while employees should comply with measures to reduce risk (Occupational Safety and Health Council, 2003a). Ergonomic principles have been recommended for the design of workstations to accommodate the bodily features and limitations of users (Occupational Safety and Health Council, 2003b). In general, HCNP in HK do not have their own computer or an individualized workstation. Owing to the increasing use of computers in community centers and to the new regulations for DSE, offices for the HCNP might not be updated as required. For instance, an office might not have a chair adjustable for height or a footrest. Some offices have limited working space and the HCNP have to sit in very close proximity to each other. In some settings, the shoulders of the nurses almost touch each other, providing very little space for stretching or normal movement. In the nursing profession, the risks related to musculoskeletal problems from patient handling have been the main focus of study. The risks posed by office work have largely been ignored. Hence, a risk assessment of the office environment and DSE

workstation of HCNP should be performed on a regular basis to identify problems and devise appropriate interventions.

Physical Isometric Loads

"Isometric" is generally taken to mean active muscular "contractions" albeit with no change in the length of the muscle(s) involved (Niebel & Freivalds, 1999; Kilbom, 1995). Static loading or static postures are generally taken to mean that there is no movement of the involved joint and that the same posture is held throughout the period of physical exertion. When the condition is "static" loading, it could involve "isometric" muscular contractions, although this might not always be the case. However, in most cases, the terms isometric loads and static loading or static posture are used interchangeably (Corlett, Wilson, & Manenica, 1986; Niebel & Freivalds, 1999). Since static postures are commonly used and understood by most people, this term rather than the term physical isometric loads will be used in this paper. Studies have found that static postures contribute to fatigue (Andersson et al., 1995; Erdil et al., 1994; Kumar, 1990a). This occurs because not moving impedes the flow of blood that is needed to bring nutrients to the muscles and to carry away the waste products of muscle metabolism (Department of Environmental Health and Safety, 2002). In addition, static postures, especially prolonged sitting and standing, are thought to be associated with back pain more frequently than are dynamic tasks, such as lifting and transferring patients (Westgaad, Warsted, Jansen, & Aaras, 1986).

Questions related to static postures were included in the present study because they have been identified as one of the physical risk factors for back pain among HCNP in the Netherlands (Knibbe & Friele, 1986). However, the term static postures was found

to be not well understood by nurses in hospitals (Rossignol & Baetz, 1987). Therefore, in this study, an explanation of this term was provided to the subjects immediately after they were asked questions relating to prolonged or sustained postures. The description of the explanation is "maintaining a fixed position, such as prolonged bending forward or awkward postures." HCNP were asked to estimate how much of their time was spent in static postures in each part of their worksite; i.e., in the patients' homes, on the road and in the office. Examples of static postures that may have occurred with nurses in this study are: performing a wound dressing in a limited working space in a patient's home; carrying a heavy nursing bag in a crowded bus; and sitting for long periods of time in the office. As a matter of fact, all of the variables relating to static postures were identified in bivariate analyses in the present study as risk factors for back pain. They are: prolonged twisting or rotation, prolonged bending to the side, prolonged squatting, and prolonged kneeling in patients' homes; and prolonged or sustained positions on the road and in the office. These risk factors were included in the multiple logistic regression together with other questions in each worksite. As mentioned in Chapter Two, the responses for each participant in each worksite were summed, and the mean score computed was then used in the analyses. However, physical isometric loads measuring static postures in the JCQ were independently identified as risk factors for back pain in this sample. Two questions were asked under this category: "I am often required to work for long periods with my body in physically awkward positions," and "I am required to work for long periods with my head or arms in physically awkward positions" (Karasek, 1985).

Psychological Job Demands

As mentioned in the conceptual framework (see Appendix B), not back pains can be increased only by physical but also by psychosocial risk factors. Psychosocial work factors such as work stress (Hollingdale, 1997; Smedley et al., 1995), monotony, low job satisfaction (Andersson et al., 1995; Bigos et al., 1991; McAbee, 1988), low support from supervisors (Lagerstrom et al., 1995), psychological job demands, and job strain (Ahlberg-Hulten, Theorell, & Sigala, 1995) have been identified as risk factors for WRBPs among hospital nursing personnel. The results of this study suggest that psychological job demands may also be a predictor for WRBPs in HCNP. In Karasek's Job Content Questionnaire (JCQ), the psychological job demands can be tabulated in two ways. Psychological job demands consist of five questions while psychological job demands (Framingham) consists of nine. Four extra questions included under the psychological job demands (Framingham) are: "My job requires long periods of intense concentration on the task"; "My tasks are often interrupted before they can be completed, requiring attention at a later time"; "My job is very hectic"; and "Waiting on work from other people or departments often slows me down on my job" (Karasek, 1985). Adding these four questions might reflect the actual work stress on HCNP in HK. Obviously, a patient's home is the "worksite" for HCNP. They have to work in unfamiliar surroundings and interact with clients and their family members (Ceslowitz & Loreti, 1991); hence, HCNP need to negotiate their appointment times and readjust their visiting plans accordingly. While they are concentrating on performing nursing procedures, such as wound dressing and urinary catheterization, they might need to answer the queries of

patients or family members. It is not surprising that the HCNP in this sample perceived their jobs as being hectic.

Children At Home

A study conducted by Brulin and his colleagues (1998) in Sweden found that having children at home could reduce the chance of having low back pain. They argued that children in the family could potentially protect HCNP against social isolation, which has been identified as risk factor for back problems. In this study, having children reduced the chance of developing back pain only if the HCNP had hired a maid at home to perform domestic work (OR = 0.52, 95% CI = 0.31 - 0.86). However, when the regression analysis was stratified by gender, this children-maid effect only worked on female participants (OR = 0.53, 95% CI = 0.30 – 0.92). This gender difference would be due to the small number of male participants, who totaled 46, not enough power to detect the significant OR. In addition, the female participants needed to do significantly more domestic work than their male counterparts ($\chi^2 = 4.40$, $p = .04$).

The results of a local study (Census and Statistics Department, 2001) on the employment of maids showed that 10% of all households in HK employed maids in 2001. Almost 90% of the maids were foreigners from Southeast Asian countries such as the Philippines, Indonesia, and Thailand. The workers usually lived in their employer's home and worked on a full-time basis. People in HK with children aged 12 and below, or persons who needed special care, were most likely to employ maids. More than 60% of the employers required the maids to clean and tidy up the household, and to purchase and cook food; and about 45% had the maids take care of their children. In this study, about

one-third of the HCNP hired a domestic helper. The results of this study suggest that having a maid may reduce physical work stresses at home.

Strength of the Study

The high response rate of 82.7% is a primary strength of this study. Having a high response rate reduces the possibility of systematic differences occurring between the nurses who responded and those who did not in terms of the variables under study. Well-planned procedures for collecting data facilitated this high response rate. Administrative support from the participating home care agencies was one of the essential components for the success of this project. The nurse in charge was contacted and appointments were made before the actual event of data collection. Another essential component of success is that the participants were invited to complete the questionnaire in their workplace (Dickinson et al., 1992). The results of this present study showed that inviting participants to complete questionnaires in their workplace produced a higher response rate (97.1%) than having them take home the questionnaires to complete (63% - 80%). The persistence and enthusiasm of the researchers could have been another factor leading to the high response rate. Each community center was visited until the target of an 80% to 90% response rate was reached. Finally, the relevance of the study to the work life of the participants was another factor. Some participants were very thankful that a study related to their physical problems and working environments was being conducted.

Besides the high response rate, the generalizability of the study results is ensured because this study employs a total population sampling method. In addition, a systematic data analysis strategy was used in this study to identify the predictors for back pain. Following descriptive analyses, bivariate statistical tests were used to estimate the

correlation between the risk factors (e.g., personal, physical, and psychosocial) and the dependent dichotomous variable (i.e., back pain and work-related back pain). Only those independent variables that showed a significant correlation with dependent variables were selected to be entered into the final hierarchical multiple logistic regression analysis. As mentioned earlier in Chapter two, the review of the literature found only one study (Brulin et al., 1998) that utilized multiple logistic regression analyses to identify predictors for low back pain among female home care personnel, a study conducted in Sweden. The use of advanced statistical methods in the present study increases the reliability of its results. Lastly, the results of the present study demonstrated that the occurrence of back pain is multifactorial in nature, including both physical and psychosocial risk factors.

Weakness of the Study

However, this study also has several limitations. Some of the participants thought the questionnaire was too long and covered too much information. Since HCNP have a tight working schedule, it may have been hard for them to complete a 30-minute questionnaire in their workplace. Various interruptions, such as phone calls and meetings, may have occurred during the time they completed the questionnaire. Moreover, the process of collecting data began a few months after the onset of the sudden acute respiratory syndrome (SARS) epidemic. Some studies on SARS were being conducted at the same time with HCNP in some community centers. This may have also created respondent fatigue.

Another limitation of the study relates to the scales used in the questionnaire. Most of the responses tended to occur on the lower end of the scale. For instance, the

respondents were asked about the frequency with which they performed lifting, pushing, or carrying activities in a bent position with three different forces (light, moderate, and strong). A 5-point Likert scale was used: never (lower end), seldom, sometimes, often, and very often (upper end). Most of the responses fell on "never" to "sometimes": 70% for light force, 90% for moderate force, and 95% for strong force. Similar results were found on the other questions. In reviewing the literature (Wiktorin, Karlqvist, & Winkel, 1993) on measurement issues related to physical risk factors, the researchers concluded that 6-point duration scales, 5-point distance scales, and 4-point frequency scales might be too detailed, specific or finely tuned (i.e., the scale intervals were too narrow) for the participants to analyze their job tasks. They might not be able to pinpoint the exact duration or frequency as described in the scale, but they believed that they were exposed; therefore, the participants might select the choices that were immediately above the "no exposure" category. In some cases, a dichotomous-level scale instead of multi-level scales might have been better.

Implications for Nursing

Musculoskeletal problems among HCNP, especially of the back, cannot be ignored, echoing recommendations made sixteen years ago by Jensen and his colleagues (1988). At the time, they foresaw a need to conduct research in the field of home care, specifically to reduce musculoskeletal problems. The results of this current study certainly contribute to an increased awareness of problems among HCNP. Some HCNP still believe that their risk of developing musculoskeletal problems is much lower than that their counterparts working in hospitals, because they do not need to lift or transfer patients as often as hospital nurses do. However, the results of this study showed that

[illegible]

HCNP (55.6%, n = 224) are more at risk of developing low back pain than their counterparts in hospitals (40.6%, n = 153) (Yip, 2001). These results should contribute to a change in their thinking, helping them to re-evaluate their risk of incurring musculoskeletal problems. The introduction of the Occupational Safety and Health Ordinance in HK in 1997 has increased awareness of safety issues in the workplace. However, deep in the culture of nursing, it is seen as unethical, unprofessional, and probably socially unacceptable for a nurse to change patient care practices in order to reduce their own level of discomfort (Harber et al., 1988). Nurses should understand that back pain is not a part of the nursing profession. Only when they know how to take care of their own occupational health can they deliver quality patient care while preserving their own well-being and working life.

Unlike their counterparts in hospitals, HCNP in HK are subject to unique risk factors in developing back problems. In this population, it is not the various activities of handling patients, but rather the ergonomically unfavourable workstations in the office that increases the risk of developing back pain. Managers should invest resources to provide an ergonomic workstation for each HCNP to reduce their risk of developing costly musculoskeletal problems. Under Section 4 of the Occupational Safety and Health (DSE) Regulation, a risk assessment of a DSE workstation is required before the station is first used. The risk assessment includes: (1) identifying the potential hazards of the DSE workstation; (2) evaluating the risks to the safety and health of users of the DSE workstation; (3) assessing the DSE workstation with respect to the display screen, input devices, work desk, chair, accessories such document holders and footrests, and the work environment; (4) deciding whether existing precautions are adequate; and (5) recording

the findings and retaining the records for a period of at least two years after that particular DSE workstation ceases to be used by anyone. In addition, HCNP, as well as other office workers, are encouraged to take a break every hour to perform a 5-minute relaxation exercise in the office, such as stretching, moving one's toes, raising one's shoulder, doing side bends, lifting leg, and curling exercises (Occupational Safety and Health Council, 2003b).

Because of their tight working schedule, HCNP might not have time to stop to think about how to arrange an ergonomically favourable workplace for themselves, especially in their patients' homes. The results of this study will serve to remind every HCNP that static postures are also a risk factor for back problems. Home care nursing personnel should spend a few minutes assessing the patients' home environment before engaging in nursing procedures that might endanger their back. Most of the time, static postures can be prevented. For instance, if the HCNP needs to perform a wound dressing on the sole of a patient, he or she should try to position the patient in a lying position. Even though the height of the bed may not be adjustable, the HCNP can stand up during the procedure to provide relief from a static squatting or kneeling posture.

Managers and HCNP should be aware that the physical workload is no longer the sole risk factor for back problems; the important role of psychosocial factors cannot be ignored. Psychosocial job demands (OR = 1.12, 95% CI = 1.02 – 1.23) were identified in the present study as one of the predictors for back pain. Moreover, HCNP who had back pain reported that their work was very hectic, their tasks were often interrupted, and they more often had to wait for other people to accomplish tasks before they could complete their own job. Therefore, it is essential to build a healthy working environment that

promotes interpersonal relations among colleagues, including maintaining open channels of communication. Stress reduction programs focusing on how to deal with interruptions and how to deal with difficult patients or families are essential, as are programs that teach stress prevention.

Future Directions for Research

The results of this cross-sectional study indicate that there is a need to reduce musculoskeletal problems among HCNP in HK. Three risk factors have been identified that are amenable to change: office work, static postures, and psychological job demands. Since this study provides an introductory evaluation of the problem, an in-depth assessment of each risk factor is necessary before intervention programs can be implemented. For instance, many hazards in the office can be contributing factors for the development of back problems. These could include the chair, work surface, working space, keyboard, or many other combinations of possibilities. A risk assessment should be performed in the office to identify all potential hazards. Because of financial constraints, it is essential to prioritize the reduction of hazards so that intervention programs can be provided accordingly. Similar prevention strategies should then be applied to the problem of static postures and psychological job demands.

Owing to the cross-sectional nature of this study, causal relationships cannot be established. The antecedent-consequence uncertainty exists; i.e., the correct temporal relationship between the risk factor and back problems may remain ambiguous. However, this study can serve as a basis for a future prospective cohort study by identifying disease-free workers. In addition, it can identify cases and controls for a case-control study. However, before conducting these advanced epidemiological studies, care should

be taken that the instrument should be modified appropriately for the study population. In addition, a factor analysis should be performed to test the validity of the instrument.

Studies investigating the feelings, functional limitations, and difficulties faced by HCNP who have suffered from back problems are limited. Qualitative and quantitative studies can be performed on those aspects. The results would be useful for managers attempting to help injured HCNP return to work or to engage in other productive activities if returning to work is not possible.

Conclusion

The results of the study deliver a strong message that there is a need for further research in the area of home care and musculoskeletal problems. Predictors for back pain identified among HCNP in the study were unique in comparison with the situation for their counterparts in hospital settings. Such predictors include office work, static postures, and psychological job demands. HCNP are exposed to at least of two of these predictors in each of their work settings, in the patients' home, on the road, and in the office. Therefore, reducing musculoskeletal problems in home care is a complex issue, requiring engineering, administrative, and behavioral controls, as well as the support of the patients.

References

Ahlberg-Hulten, G., Theorell, T., & Sigala, F. (1995). Social support, job strain and musculoskeletal pain among female health care personnel. Scandinavian Journal of Work Environment and Health, 21, 435-439.

Agnew, J. E. (1987). Back pain in hospital workers. In E. A. Emmett (Ed.), State of the Art Review: Occupational Medicine (Vol. 2, pp. 609-616). Philadelphia: Hanley & Belfus.

Alleyne, B. C., Dufresne, R. M., Kanji, N., & Reesal, M. R. (1989). Costs of workers' compensation claims for hearing loss. Journal of Occupational Medicine, 31(2), 134-138.

AMA Council on Scientific Affairs. (1990). Council report: Home care in the 1990s. JAMA, 263(9), 1241-1244.

Andersson, G. B. J., Fine, L. J., & Silverstein, B. A. (2000). Musculoskeletal disorders. In B. S. Levy & D. H. Wegman (Eds.), Occupational health: Recognizing and preventing work-related disease and injury (4th ed., pp. 503-535). Philadephia: Lippincott Williams & Wilkins.

Baker, D. B., & Karasek, R. A. (2000). Stress. In B. S. Levy & D. H. Wegman (Eds.), Occupational health: Recognizing and preventing work-related disease and injury (4th ed., pp. 419-436). Philadephia: Lippincott Williams & Wilkins.

Baron, S., Hales, T., & Hurrell, J. (1996). Evaluation of symptom surveys for occupational musculoskeletal disorders. American Journal of Industrial Medicine, 29, 609-617.

Bernard, B. P. (Ed.). (1997). Musculoskeletal disorders and workplace factors. Cincinnati, OH: U.S. Department of Health and Human Services. Public Health Service. Centers for Disease Control and Prevention. National Institute for Occupational Safety and Health. DHHS (NIOSH) Publication No. 97-141.

Bigos, S. J., Battie, M. C., Spengles, D. M., Fisher, L. D., Fordyce, W. E., Hasson, T. H., Nachemson, A. L., & Wortley, M. D. (1991). A prospective study of work perceptions and psychosocial factors affecting report of back injury. Spine, 16(1), 1-6.

Bird, F. E., & Germain, G. L. (1986). Practical loss control leadership. Loganville, GA: Institute Publishing.

Borg, G. (1970). Perceived exertion as an indicator of somatic stress. Sccandinavian Journal of Work Environment and Health, 2-3, 92-98.

Brulin, C., Gerdle, B., Granlund, B., Hoog, J., Knutson, A., & Sundelin, G. (1998). Physical and psychosocial work-related risk factors associated with musculoskeletal symptoms among home care personnel. Scandinavian Journal of Caring Science, 12, 104-110.

Buckle, P. (1987). Epidemiological aspects of back pain within the nursing profession. International Journal of Nursing Studies, 24(4), 319-324.

Buckle, P. W., Stubbs, D. A., & Baty, D. (1996). Musculo-skeletal disorders (and discomfort) and associated work factors (Chapter 2, pp. 19 -30). In N. Corlett, J. Wilson, and L. Manenica (Ed.). The ergonomics of working postures. London: Taylor & Francis.

Bureau of Labor Statistics (BLS). (1999). Safety and health statistics. Washington, D.C.: United States Department of Labor [On-line]. Available: http://stats.bls.gov/text%5Fonly/oshhome%5Ftxt.htm.

Census and Statistics Department. (2001). Thematic household survey report No. 5. Hong Kong: Hong Kong Special Administrative Region People's Republic of China.

Census and Statistics Department. (2003). Hong Kong Annual Digest of Statistics 2003 Edition. Hong Kong: Hong Kong Special Administrative Region People's Republic of China.

Ceslowitz, S. B., & Loreti, S. T. (1991). Easing the transaction from hospital nursing to home care: A research study. Home Healthcare Nurse, 9, 32-35.

Charmaz, K. (2000). Grounded theory: Objectivist and constructivist methods. In N. K. Denzin & Y. S. Lincoln (Eds.), The handbook of qualitative research (pp. 509-535). Thousand Oaks, CA: Sage.

Checkoway, H., Pearce, N. E., & Crawford-Brown, D. J. (1989). Research methods in occupational epidemiology. New York: Oxford University Press.

Cheung, K. (1997). Low back injuries in Alberta home care nurses. Unpublished master dissertation, University of Alberta, Edmonton, Canada.

Cheung, K. (1999). Close calls for low-back injuries. The Canadian Nurse, 95(7), 47-48.

Cheung, K. (2000). The influence of organizational factors on occupational low back injuries. Home Healthcare Nurse, 18(7), 463-469.

Chiou, W.-K., Wong, M.-K., & Lee, Y.-H. (1994). Epidemiology of low back pain in Chinese nurses. International Journal of Nursing Studies, 31(4), 361-368.

Chung, P.-h., Chow, C.-y., Chu, W.-s. D., Kong, H.-k., & Lam, W.-y. (2000). Prevalence of knee pain in community nurse. Department of Community and Family Medicine, The Chinese University of Hong Kong.

Cohen, J., & Cohen, P. (1983). Applied multiple repression/correlation analysis for the behavioral sciences (2nd ed.). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Corlett, N., Wilson, J., & Manenica, L. (Ed.) (1986). The ergonomics of working postures. London: Taylor & Francis.

Department of Environmental Health and Safety (2002). University of Iowa [On-line]. Available: http://www.ehs.iastate.edu/oh/static.htm. Accessed on May 9, 2004.

Dickinson, E. E., Campion, K., Foster, A. F., Newman, S. J., O'Rourke, A. M. T., & Thomas, P.G. (1992). Questionnaire development: An examination of the Nordic Musculoskeletal Questionnaire. Applied Ergonomics, 23, 197-201.

Dulock, H. L., & Holzemer, W. L. (1991). Substruction: Improving the linkage from theory to method. Nursing Science Quarterly, 4(2), 83-87.

Elashoff, J. (2000). nQuery Advisor sample Size and Power Determination. Boston: Statistical Solutions.

Elert, J., Brulin, C., Gerdle, B., Johansson, H. (1992). Mechanical performance, level of continuous contraction and muscle pain symptoms in home care personnel. Scandinavian Journal of Rehabilitation Medicine, 24, 141-150.

Erdil, M., Dickerson, O. B., & Chaffin, D. B. (1994). Biomechanics of manual materials handling and low-back pain. In C. Zenz, O. B. Dickerson, and E. P. Horvath (Eds), Occupational Medicine (3rd ed.) (pp. 239-257). St. Louise, MO: Mosby-Year Book.

French, P., Lee, S. P. W. F., Liu, S. P., Luk, K. B., & Wong, H. Y. R. (1997). The prevalence and cause of occupational back pain in Hong Kong registered nurses. Journal of Advanced Nursing, 26, 380-388.

Fu, L. C. (1997). Leisure Participation Patterns of Sha Tin District Residents in Hong Kong. Unpublished master thesis. Victoria University, Melbourne, Australia (enrolled at The University of Hong Kong - School of Professional and Continuing Education [On-line]. Available: http://www.staff.vu.edu.au/PeterKalmund/html/1995-97_hk.htm#Participation.

Garg, A., & Owen, B. D. (1992). Reducing back stress to nursing personnel: An ergonomic intervention in a nursing home. Ergonomics, 35(11), 1353-1375.

Gerdle, B., Brulin, C., Elert, J., & Granlund, B. (1994). Factors interacting with perceived work-related complaints in the musculoskeletal system among home care service personnel. Scandinavian Journal of Rehabilitation Medicine, 26, 51-58.

Gillen, M. (1996). Nonfatal falls in construction workers: Predictors of injury severity. Unpublished PhD dissertation, University of California, San Francisco, USA.

Halpern, M., Hiebert, R., Nordin, M., Goldsheyder, D., & Crane, M. (2001). The test-retest reliability of a new occupational risk factor questionnaire for outcome studies of low back pain. Applied Ergonomics, 32, 39-46.

Hannerz, H., & Tuchsen, F. (2002). Hospitaliztions among female home-helpers in Denmark, 1981-1997. American Journal of Industrial Medicine, 411-10.

Harber, P., Billet, E., Gutowshi, M., SooHoo, K., Lew, M., & Roman, A. (1985). Occupational low -back pain in hospital nurses. Journal of Occupational Medicine, 27(7), 518-524.

Harber, P., Ballet, E., Vojtecky, M., Rosenthal, E., Shimozaki, S., & Horan, M. (1988). Nurses' belief about cause and prevention of occupational back pain. Journal of Occupational Medicine, 30, 797-800.

Harvey, M., & Lyons, D. (1993). Occupational injuries to graduate nurses. Paper presented at the The Seventh Annual Margaret Scott Wright Lectureship and Research Conference, Edmonton.

Hedin, A. (1997). Attitude to work and health problems among home care workers in settings with different degrees of institutionalization. Scandinavian Journal of Rehabilitation Medicine, 29, 197-203.

Hempel, S. (1993). Home truths. Nursing Times, 89(15), 40-41.

Hignett, S. (1996). Work-related back pain in nurses. Journal of Advanced Nursing, 23, 1238-1246.

Ho, S.-T., Au-Yeung, B., Au, G., Huang, H., & Ko, F. (1997). Study of back pain amongst nurses. The Hong Kong Nursing Journal, 33(2), 5-11.

Hoaglund, F. T., & Byl, N. N. (1997). Musculoskeletal injuries. In J. LaDou (Ed.), Occupational & environmental medicine (2nd ed., pp. 64-88). Stamford: Appleton & Lange.

Hollingdale, R. (1997). Back pain in nursing and associated factors: A study. Nursing Standard, 11(39), 35-38.

Holmstrom, E., & Moritz, U. (1991). Low back pain - correspondence between questionnaire, interview and clinical examination. Scandinavian Journal of Rehabilitation Medicine, 23, 119-125.

Hosmer, D. W., & Lemeshow, S. (2000). Applied logistic regression (2nd ed.). New York: Wiley.

Hospital Authority. (1996). Evaluative research of community nursing service in Hong Kong. Hong Kong: The research group subcommittee on community nursing service coordinating committee (Nursing), Hospital Authority of Hong Kong.

Hospital Authority. (1999). HA Statistical Report 1998/1999. Chart 6.a Community Nursing Services Home Visits 1989/90-1998/99 [On-line]. Available: [http://www.ha.org.hk/hesd/nsapi/?MIval=ha_visitor_index&intro=ha%5fview%5ftemplate%26group%3dIFN%26Area%3dPBL] [2000, November 15].

Hospital Authority. (2004a). Community nursing service [On-line]. Available: http://www.ha.org.hk/hesd/nsapi/?MIval=ha_visitor_index&intro=ha%5fview%5ftemplate%26group%3dOSR%26Area%3dCMS.

Hospital Authority. (2004b). Community psychiatric nursing service [On-line]. Available: http://www.ha.org.hk/hesd/nsapi/?MIval=ha_visitor_index&intro=ha%5fview%5ftemplate%26group%3dOSR%26Area%3dCMS.

Hsieh, F.Y. (1989) A simple method of sample size calculation for linear and logistic regression. Statistics in Medicine, 17,1623-1634.

Humphrey, C. J. (1988). The home as a setting for care: Clarifying boundaries. Nursing Clinics of North America, 23(2), 305-315.

International Labour Organization (ILO). (1999). World of Work, No. 31, September/October [On-line]. Available: http://www.ilo.org/public/english/bureau/inf/magazine/31/work.htm.

Janizewski, A. L., & Caley, L. M. (1995). First in a series: Preventing back injury in home care. Caring Magazine, 14(1), 54-58.

Jensen, R. C. (1987). Disabling back injuries among nursing personnel: Research needs and justification. Research in Nursing and Health, 10, 29-38.

Johansson, J. A. (1995). Psychosocial work factors, physical work load and associated musculoskeletal symptoms among home care workers. Scandinavian Journal of Psychology, 36, 113-129.

Johnson, J. L., & Hall, E. M. (1988). Job strain, work place social support, and cardiovascular disease: A cross-sectional study of a random sample of the Swedish working population. American Journal of Public Health, 78(10), 1336-1342.

Kagan, A. & Levi, L. (1975). Health and environment - Psychosocial stimuli: A review (Chapter 25, pp. 241 -260). In L. Levi, Society, stress and disease (Volume 2). New York: Oxford University.

Karasek, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. Administrative Science quarterly, 24, 285-308.

Karasek, R. A. (1985). Job content questionnaire and user's guide. Revision 1.1.

Karasek, R. (1998). Demand/control model: A social, emotional, and physiological approach to stress risk and active behaviour development. In J. M. Stellman (Ed.), Encyclopaedia of occupational health and safety (4th ed., Vol. 2, pp. 34.36-34.14). Geneva: International Labour Office.

Karasek, R., Brisson, C., Kawakami, N., & Amick III, B. C. (1998). The job content questionnaire (JC): An instrument for internationally comparative assessment of psychosocial job characteristics. Journal of Occupational Health Psychology, 3(4), 322-355.

Karasek, R., & Theorell, T. (1990). Healthy work: Stress, productivity, and the reconstruction of working life. New York: Basic Books.

Karasek, R., & Theorell, T. (2000). The demand-control-support model and CVD. Occupational Medicine: State of the Art Reviews, 15(1), 78-83.

Kilbom, A. (1995). Measurement and assessment of dynamic work (Chapter 22). In J. R. Wilson and E. N. Corlett, Evaluation of human work: A practical ergonomic methodology (2nd ed.). London: Taylor & Francis.

Knapp, R. G., & Miller III, M. C. (1992). Clinical epidemiology and biostatistics. Malvern, Pennsylvania: Harwal.

Knibbe, J. J., & Friele, R. D. (1996). Prevalence of back pain and characteristics of the physical workload of community nurses. Ergonomics, 39(2), 186-198.

Krause, N., Ragland, D. R., Fisher, J. M., & Syme, S. L. (1998). 1998 Volvo award winner in clinical studies. Psychosocial job factors, physical workload, and incidence of work-related spinal injury: A 5-year prospective study of urban transit operators. Spine, 23(23), 2507-2516.

Kumar, S. (1990). Cumulative load as a risk factor for back pain. Spine, 15, 1311-1316.

Kuorinka, I., Jonsson, B., Kilbom, A., Vinterberg, H., Biering-Sorensen, F., Andersson, G. B. J., & Jorgensen, K. (1987). Standardised Nordic questionnaires for the analysis of musculoskeletal symptoms. Applied Ergonomics, 18, 233-237.

Lagerlof, E., & Broberg, E. (1989). Occupational injuries and diseases. In D. K. Brune & C. Edling (Eds.), Occupational hazards in the health professions. Boca Raton, FL: CRC Press.

Lagerstrom, M., Wenemark, M., Hagberg, M., & Hjelm, E. W. (1995). Occupational and individual factors related to musculoskeletal symptoms in five body regions among Swedish nursing personnel. International Archieves of Occupational and Environmental Health, 68, 27-35.

Lam, K. C. (1998). Constraints on Recreational Sport Participation - A Case Study of a Private Residents Club in Hong Kong. Unpublished master thesis. Victoria University, Melbourne, Australia (enrolled at The University of Hong Kong - School of Professional and Continuing Education [On-line]. Available: http://www.staff.vu.edu.au/PeterKalmund/html/1998_hk.htm#Constraints.

Landsbergis, P., & Theorell, T. (2000). Measurement of psychosocial workplace exposure variables: Self-report questionnaires. Occupational Medicine: State of the Art Reviews, 15(1), 163-188.

Leff, E. W., Hagenbach, G. L., & Marn, K. K. (2000). Preventing home health nursing assistant back and shoulder injuries. The Joint Commission of Journal on Quality Improvement, 26(10), 587-600.

Leung, A. S. L. (1999). Prevalence of low back pain in the population of Hong Kong: A telephone survey II: Frequency and utilization of services.: Health services research committee, HSRC Report #9.

Levy, B. S., & Wegman, D. H. (1995). Occupational health in the global context: An American perspective. In B. S. Levy & D. H. Wegman (Eds.), Occupational health: Recognizing and preventing work-related disease (3rd ed., pp. 3-24). Boston: Little Brown.

Lungberg, G., & Gerdle, B. (2000). Correlations between joint and spinal mobility, spinal sagittal configuration, segmental mobility, segmental pain, symptoms and disabilities in female homecare personnel. Scandinavian Journal of Rehabilitation Medicine, 32, 124-133.

Lynn, M. R. (1986). Determination and quantification of content validity. Nursing Research, 35(6), 382-385.

Martin, D. P., Engelberg, R., Agel, J., & Swiontkowski, M. F. (1997). Comparison of the Musculoskeletal Function Assessment Questionnaire with the Short Form-36, the Western Ontario and McMaster Universities Osteoarthritis Index, and the Sickness Impact Profile Health-Status Measures. The Journal of Bone and Joint Surgery, 79-A(9), 1323-1335.

McAbee, R. R. (1988). Nurses and back injuries: A literature review. AAOHN Journal, 36, 200-209

Meleis, A. I. (1997). Theoretical nursing: Development and Progress (3rd ed.). Philadephia: Lippincott.

Messias, C. K. H., Im, E., Page, A., Regev, , E., Spiers, J. A., Yoder, L., & Meleis, A. I. (1997). Defining and redefining work: Implications for women's health. Gender & Society, 11, 296-323.

Messias, C. K. H., Regev, H. R., Im, E., Spiers, J. A., Van, P., & Meleis, A. I. (1997). Expanding the visibility of women's work: Policy implications. Nursing Outlook, 45, 258-264.

Melin, B., & Lundberg, U. (1997). A biopsychosocial approach to work-stress and musculoskeletal disorders. Journal of Psychophysiology, 11, 238-247.

Meyer, J. D., & Muntaner, C. (1999). Injuries in home health care workers: An analysis of occupational morbidity from a state compensation database. American Journal of Industrial Medicine, 35, 295-301.

Myers, A., Jensen, R., C., Nestor, D., & Rattiner, J. (1993). Low back injuries among home health aides compared with hospital nursing aides. Home Health Care Services Quarterly, 14(2/3), 149 - 155.

National Institutional for Occupational Safety and Health (NIOSH). (1997). Elements of ergonomics programs. U.S. Department of Health and Human Services.

National Research Council. (1999). Work-related Musculoskeletal Disorders: Report, workshop summary, and workshop papers. Washington, DC: National Academy.

Niebel, B., & Freivalds, A. (1999). Manual Work Design (Chapter 4). Methods standards and work design (10th ed.). Boston: McGraw-Hill.

Occupational Safety and Health Council. (2003a). Safety & health guides for working with DSE. Hong Kong: Occupational Safety and Health Council.

Occupational Safety and Health Council. (2003b). Office safety & health. Hong Kong: Occupational Safety and Health Council.

Ono, Y., Lagerstrom, M., Hagberg, M., Linden, A., & Malker, B. (1995). Reports of work related musculoskeletal injury among home care service workers compared with nursery school workers and the general population of employed women in Sweden. Occupational and Environmental Medicine, 52, 686-693.

Ortiz-Hernandez, L., Tamez-Gonzalez, S., Martinez-Alcantara, S., & Mendez-Ramirez, I. (2003). Computer use increases the risk of musculoskeletal disorders among newspaper office workers. Archives Medical Research, 34, 331-342.

Owen, B. D. (1999). Health and safety: Preventing back injuries. American Journal of Nursing, 99, 76.

Owen, B. D., & Staehler, K. S. (2003). Decreasing back stress in home care. Home Healthcare Nurse, 21, 180-186.

Pilot, D. F., & Hungler, B. P. (1995). Nursing Research: Principles and methods (4th ed.). Philadephia: J.B. Lippincott.

Portney, L. G., & Watkins, M. P. (1993). Foundations of clinical research: Applications to practice. Connecticut: Appleton & Lange.

Roland, M., & Morris, R. (1983). A study of the natural history of back pain: Part I: Development of a reliable and sensitive measure of disability in low-back pain. Spine, 8(2), 141-144.

Rossignol, M., & Baetz, J. (1987). Task-related risk factors for spinal injury: Validation of a self-administered questionnaire on hospital employees. Ergonomics, 30(11), 1531-1540.

Sauter, S. L., Hurrell, J. J., Murphy, L. R., & Levi, L. (1998). Psychosocial and organizational factors. In J. M. Stellman (Ed.), Encyclopaedia of occupational health and safety (4th ed., Vol. 2, pp. 34.32-34.33). Geneva: International Labour Office.

Sauter, S. L., & Swanson, N. G. (1995). An ecological model of musculoskeletal disorders in office work (Chapter 1, pp. 3 -21). In S. D. Moon and S. L. Sauter (Ed.), Beyond Biomechanics: Psychosocial aspects of musculoskeletal disorders in office work. London: Taylor & Francis.

Siegrist, J. (1996). Adverse health effects of high-effort/low -reward conditions. Journal of Occupational Health Psychology, 1(1), 27-41.

Skarplik, C. (1988). Patient handling in the community. Nursing (London), 3(30), 13-16.

Smedley, J., Egger, P., Cooper, C., & Coggon, D. (1995). Manual handling activities and risk of low back pain in nurses. Occupational and Environmental Medicine, 52(3), 160-163.

Smith, W. A., & White, M. C. (1993). Home health care: Occupational health issues. AAOHN Journal, 41(4), 180-185.

Snook, S. H., Fine, L. J., & Silverstein, B. A. (1988). Musculoskeletal disorders. In B. S. Levy & D. H. Wegman (Eds.), Occupational health: Recognizing and preventing work-related disease (2nd ed., pp. 345-370). Boston: Little, Brown.

SPSS. (1999). SPSS for Windows. Release 10.0. Chicago: SPSS.

Steenland, K. (2000). Research findings linking workplace factors to cardiovascular disease outcomes. Occupational Medicine: State of the Art Reviews, 15(1), 7-68.

Stubbs, D. A., Buckle, P. W., Hudson, M. P., Rivers, P. M., & Baty, D. (1986). Backing out: Nurses wastage associated with back pain. International Journal of Nursing Studies, 23(4), 325-336.

Swiontkowski, M. F., Engelberg, R., Martin, D. P., & Angel, J. (1999). Short musculoskeletal function assessment questionnaire: Validity, reliability, and responsiveness. The Journal of Bone and Joint Surgery, 81-A(9), 1245-1260.

The College of Nursing, H. K. (1997). Standards for community nursing practice: General standards and criteria. Hong Kong: Specialty Standards Subcommittee of the College of Nursing, Hong Kong.

Torgen, M., Alfredsson, L., Koster, M., Wiktorin, C., Smith, K., & Kilbom, A. (1997). Reproducibility of a questionnaire for assessment of present and past physical activities. International Archieves of Occupational and Environmental Health, 70, 107-118.

Torgen, M., Nygard, C., & Kilbom, A. (1995). Physical work load, physical capacity and strain among elderly female aides in home-care service. European Journal of Applied Physiology, 71, 444-452.

U.S. Department of Labor. (1996). Home health care services: Injuries resulting in absences from work. Lost worktime injuries and work hazards: Supplement to news release, USDL-96-163 [On-line]. Available: (http://stats.bls.gov/case/ostb0361.pdf).

U.S. Department of Labor. (1997). Injuries to caregivers working in patient's home. Issues in Labor Statistics, February [On-line]. Available: http://stats.bls.gov/oshwc/ossmo0011.pdf.

U.S. Department of Labor. (1999). Ergonomics program; proposed rule. Federal register, 64(225).

U.S. Department of Labor. (2004). Career guide to industries 2004-05 edition.[On-line]. Available: http://www.bls.gov/oco/cg/. Accessed March 16, 2004.

Viikari-Juntura, E., Rauas, S., Martikainen, R., Kuosma, E., Riihimaki, H., Takala, E.-P., & Saarenmaa, K. (1996). Validity of self-reported physical work load in epidemiologic studies on musculoskeletal disorders. Scandinavian Journal of Work Environment and Health, 22, 251-259.

Westgaard, R. H., Warsted, M., Jansen, T., & Aaras, A. (1985). Muscle load and illness associated with constrained body postures (Chapter 1, pp. 5 - 18). In N. Corlett, J. Wilson, and L. Manenica (Ed.). The ergonomics of working postures. London: Taylor & Francis.

Whittemore, A. (1981) Sample size for logistic regression with small response probability. Journal of the American Statistician Association, 76, 27-31.

Wiktorin, C., Karlqvist, L., & Winkel, J. (1993). Validity of self-reported exposures to work postures and manual material handling. Scandinavian Journal of Work Environment and Health, 19, 208-214.

Wiktorin, C., Wigaeus, H. E., Winkel, J., & Koster, M. (1996). Reproducibility of a questionnaire for assessment of physical load during work and leisure time. Journal of Occupational and Environmental Medicine, 38, 190-201.

Xie, X., Wang, M., & Xu, L. (2003). What risks are Chinese people concerned about. Risk Analysis, 23, 685-695.

Yassi, A. (2000). Work-related musculoskeletal disorders. Current Opinion in Rheumatology, 12, 124-130.

Yip, Y. B. (2001). A study of work stress, patient handling activities and the risk of low back pain among nurses in Hong Kong. Journal of Advanced Nursing, 36(6), 794-804.

Appendix A

A summary table of Work-related back problems studies among nursing personnel in Hong Kong

Author/Year	Design	Instrument	Sample	Main Findings (Prevalence/Incidence/Risk Factors)	Comment
French et al., 1997 (HK) (a hospital)	Cross-sectional study	Q (13 items)	n=47 RNs (78%, N=60) 60 subjects' names were randomly selected from a box containing 590 nurses' names (name list obtained from the hospital for the period of Dec 26, 1994 to Jan 22, 1995)	Prevalence: (1) prevalence of back pain during nursing career = 80.9% Frequency of back pain: (1) 13% experienced daily (2) 45% experienced a few times a year Site of back pain: (1) low back (n=24, 63%) Risk factors: (1) working experience: all nurses with less than 2 years' working experience had back pain (2) unit of assignment: Orthopaedic, then elderly, and medicine (3) dynamic factors: transferring patients and lifting patients within bed without assistance (4) static factors: stooping Effects of back pain: (1) transferred to light duty job (n=3, 7.9%) (2) not officially reported (n=35, 92%)	Limitations: (1) small sample size, but random sampling technique was used (? representative to the hospital RNs?) (2) self defined back pain (3) descriptive data

Note: Q = Questionnaire

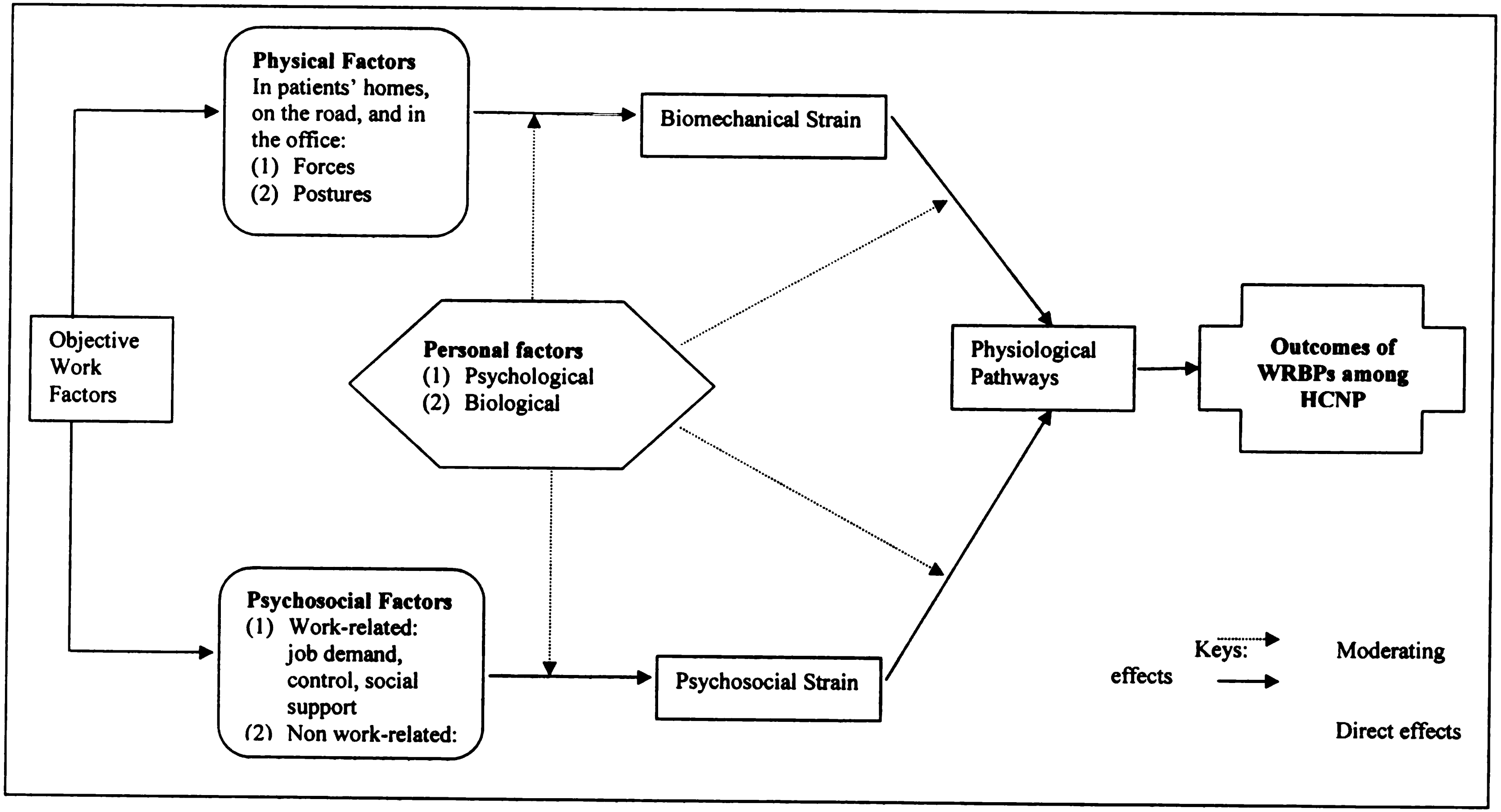
A summary table of Work-related back problems studies among nursing personnel in Hong Kong

Author/Year	Design	Instrument	Sample	Main Findings (Prevalence/Incidence/Risk Factors)	Comment
Ho et al., 1997 (a public hospital)	Cross-sectional study	Q (modified Oswestry Disability Index)	n=659 (77%, N=854) RNs, Enrolled nurses, student nurses, other nurse managers	Prevalence (1) life time prevalence of back pain=70% (2) 3-month prevalence = 29% Risk factors: (1) lifting (2) front line nurses (they had higher prevalence than administrative nursing personnel) (3) shortage of staff Disability: (1) sick leave: among the 187 nurses who had low back pain in the past 3 months, 15% had sick leave (2) total time loss: the total loss of working days was 528 (1.1% nursing work force) in the 3 month period studied	Limitation: (1) the instrument not tested before the study (1) descriptive data (2) used back pain and low back pain interchangeably
Yip, 2001 (6 public hospitals)	Cross-sectional study	Self developed Q	N = 377 RNs and ENs	12-month prevalence = 40.6% Risk Factors: (1) occasionally or never enjoyed their work (OR = 2.07) (2) frequent manual repositioning of patients on the bed (OR = 1.84) (3) assisting patients while walking (OR = 2.11) after adjusting for psychological distress, socio-demographics and lifestyle factors	general cross-section study limitations

Note: Q = Questionnaire

Appendix B

A Conceptual Framework for Work-Related Back Problems among Home Care Nursing Personnel



Appendix C

A summary table of research studies related to work-related back problems among home care nursing personnel

Author/Year	Design	Instrument	Sample	Main Findings (Prevalence/Incidence/Risk Factors)	Comment
Smith & White, 1993 (USA)	Cross-sectional	Q for all injuries (including back injuries) –3 page, tested for face validity (July1990-June1991)	n=58 directors (N=173)	- 45% of injuries (total=51) in home care are due to the back - 83% of agencies with back care policy - 86% of agencies with back care education & training	- small sample size (n=58) - low response rate (33.5%) - surveyed directors only - injury data from injury records - not directly related to back problems
Myers et al., 1993 (USA)	Cross-sectional comparison	Injured records for low back injuries (1984-1986)	Not known Only # injuries in injury records (HHAs=56; NAs=35)	**Incidence**: annual incidence injury rate for HHAs (15.4) > hospital NAs (5.9) ($p<0.001$) **Risk factors**: Helping patient in/out tub, stooped over patient in bed, helping patient from bed, driving, slipped without falling, making bed, stepping down to lower level, walking from dwelling, working alone	- formal injury data - small sample size (1 hospital and 2 home care agencies) - NAs only - Descriptive information
Meyer & Muntaner, 1999 (USA)	Cross-sectional and comparison	Worker's compensation records for all injuries (back injuries)	n for home health workers=386, n for nursing home =3,048, & n for hospital=1,404	- the days lost from work due to back injuries for home care workers (60) > nursing home workers (27) and cost more - prevalence & risk factors: not study purpose	- formal injury data - analyze all injury data - not specifically related to back injury

Note: Q = Questionnaire

A summary table of research studies related to work-related back problems among home care nursing personnel (Cont'd)

Author/Year	Design	Instrument	Sample	Main Findings (Prevalence/Incidence/Risk Factors)	Comment
Skarplik, 1993 (UK)	Cross-sectional	Q (pain in last year, site, cause, caused by, preventable, training, last training, duration of training)	n=39	**Annual prevalence (not sure)** Back pain = 14/39 = 36% **Risk factor** - lifting (16/22=73%), work-related (17/22=77%), organizational (lack of education and training)	- small sample size (n=39) - no information about N - no information about response rate - no information about who are the subjects (RNs, or NAs) - simple questionnaire
Cheung, 1997,1999, 2000 (Canada)	Cross-sectional	Q (tested for face validity)	n=400 (response rate=36%, N=1,114)	**Prevalence** Annual = 20% **Risk factors (self-identified)** - road conditions, nursing bag, driving, patient homes, lack of policy and training	- low response rate (36%) - RNs only - descriptive information
Knibbe & Friele, 1996 (The Netherlands)	Cross-sectional	Modified Nordic Musculoskeletal questionnaire (NMQ) for back pain	n=355 (all female for analysis) [390 returned (response rate=94%, N=415)	**Prevalence** Lifetime=87%, annual=66.8%, 3months=51.8%, 7day=20.6% - CNs > CNAs **Risk factors (self-identified)** - lifting/transferring, static loads, unexpected situations, wrong lifting techniques	- descriptive information about risk factors - no comparison between CNs and CNAs in risk factors - no mention about risk factors derived from road, weather, home environments, nursing bags etc.

Note: Q = Questionnaire

A summary table of research studies related to work-related back problems among home care nursing personnel (Cont'd)

Author/Year	Design	Instrument	Sample	Main Findings (Prevalence/Incidence/Risk Factors)	Comment
Brulin, et al, 1998 (Sweden)	Cross-sectional	NMQ	361 HCNP who worked in sheltered living or home care service	**7-day prevalence:** low-back=40 (CI: 35-45) upper back=30 (25-35) neck=44 (39-49) shoulder=47 (42-52) arm =10 (7-13) hand=20 (16-25) hip=18(14-22) knee=21(17-26) foot=21(17-26) **Personal risk factor:** #of children living at home (OR=0.4; CI = 0.2-0.8) **Physical risk factor:** standing in forward-bent and twisted postures (OR = 2.1; CI = 1.3-3.5)	

Note: Q = Questionnaire

Appendix D

Sample Size Estimation

Two methods have been used to estimate the sample size for the present study. One was to detect an adequate sample size for t-test comparisons, and the other for logistic regression.

Sample size determination for t-test

Based on 90% power with an effect size of 0.20 at 5% significant level, the required sample size was 258 (Cohen & Cohen, 1983).

Sample size determination for logistic regression

The required sample size for logistic regression in the present study could be calculated based on the methods suggested by Hsieh (1998), Whittemore (1981), and Elashoff (2000). In the present study, the independent variable has two levels, whether a subject has back pain or not (i.e. yes or no response) while the dependent variables are nominal, ordinal or continuous measurements. The sample size determination for logistic regression consists of two parts (Elashoff, 2000; Hsieh, 1998; Whittemore, 1981). The first part is to calculate the sample size based on one single covariate (see formula 1). The second step involves the sample sizes calculated from the first part multiply by a factor (see formula 2) to obtain the sample size required for the present study.

The formulas are as follows:

$$n = \frac{[Z_{1-\alpha/2} + Z_{1-\beta}\exp(-\frac{\beta^2}{4})]^2}{p_M \beta^2}[1+2p_M\Delta] \qquad (1)$$

where

$$\Delta = \frac{[1+(1+\beta^2)\exp(\frac{-\beta^2}{4})]}{1+\exp(\frac{-\beta^2}{4})}, \quad \beta = \log(\frac{p_t(1-p_M)}{p_M(1-p_t)}$$

p_M and p_t are the event rate at the event rates at X=0 and X=1, respectively; and

log odds value $\beta = \log(\frac{p_t(1-p_M)}{p_M(1-p_t)})$

$$n_p = n_1 /(1-\rho^2_{1.23\ldots p}) \qquad (2)$$

where ρ^2 = the squared multiple correlation coefficient, also known as R^2, is equal to the proportion of the variance of X_1 explained by the regression relationship with $X_2, \ldots, X_p$. The term $1/(1-\rho^2_{1.23\ldots p})$ is referred to as a variance inflation factor (VIF). The required sample size for the multivariate case can also be approximated from the univariate case by inflating it with the same factor $1/(1-\rho^2_{1.23\ldots p})$.

n_p and n_1 are the sample sizes required for a logistic regression model with p and 1 covariates, respectively.

According to the above methods, the sample size required was calculated using a computer program nQuery (Elashoff, 2000). Based on 90% power with $p_M = .50$, $\beta = 1.50$, and $\rho^2 = .20$ at 5% significant level, the required sample for a continuous covariate adjusted for p multiple covariates was 322. That is, when the sample size was 322, the logistic regression test of $\beta = 0$ ($\alpha = .050$ two-sided) would have 80% power to detect an odds ratio of 1.50; this assumed that one normally distributed covariate x was being added to the model after adjustment for prior covariates, that its multiple

correlation with covariates already in the model was .20 and, that the proportion of successes at the mean of x was .50.

Appendix E

Hong Kong Back Problems Questionnaire

English and Chinese Versions

Information Sheet

Date:

Dear Community Health Nursing Personnel:

My name is Kin Cheung. I am a graduate student in the School of Nursing at the University of California, San Francisco and a staff member of the School of Nursing at the Hong Kong Polytechnic University. I am conducting a study about work-related back problems in Hong Kong community health nursing personnel. The purpose of this study is to describe the prevalence of and risk factors for work-related back problems in your job. It is anticipated that the findings of this study may increase awareness of back problems in nursing work settings. It may also assist others in developing back injury prevention programs for community nursing personnel.

Your participation in this study involves completing the enclosed questionnaire and returning it to me or the Research Assistant. It will take about **30 minutes** for you to complete this questionnaire.

Participation in this study is voluntary and your consent to participate in this study will be implied with the return of the completed questionnaire. Please do **NOT** put your name on the questionnaire. All replies will be anonymous and data will be treated confidentially.

If you wish to participate in a future research study about this topic, please fill out the last page of the questionnaire and provide us with your name, email address, and phone number. Please detach this last page from the questionnaire and place it in the envelope provided. Please return the sealed envelope **separately** from the questionnaire.

If you have any complaints about the conduct of this research study, please do not hesitate to contact Mr. Eric Chan, Secretary of the Human Subjects Ethics Sub-Committee of the Hong Kong Polytechnic University in person or in writing (c/o Human Resources of the University).

If you have any questions while filling out the questionnaire, please feel free to ask me or the Research Assistant. If you want to know more about this study, please contact me at: 2766-6773 or hskin@inet.polyu.edu.hk.

Thank you for your assistance in completing this questionnaire.

Yours truly,

Kin Cheung, RN, MN, Ph.D. Candidate

Section I Your Workload

(Please write your answers on the space provided)

1. Think about your **NORMAL work schedule**. On average,

   (a) how many regular hours a week do you work? _________ hours/week

   (b) how many **paid overtime** hours do you work on average per week? ____ hours/week

   (c) how many **unpaid but with holiday compensation overtime** hours do you work on average per week? ____ hours/week

   (d) how many **unpaid and no holiday compensation overtime** hours do you work on average per week? ____ hours/week

2. Think about your working hours on **the LAST DAY that you worked**,

   (a) how many regular hours did you work? _________ hours

   (b) how many **paid overtime** hours did you work? ____ hours

   (c) how many **unpaid but with holiday compensation overtime** hours did you work? ____ hours

   (d) how many **unpaid and no holiday compensation overtime** hours did you work? ____ hours

3. Think about your working activities on **the LAST DAY that you worked**.
   (If your answers are less than 1 hour, use ¼ hour for 15 minutes, and ½ hour for 30 minutes.)

   (a) how many patients did you visit? _________ patients

   (b) how much time did you spend in patients' homes or nursing homes? ______ hours

   (c) how much time did you spend on the road (i.e. traveling time)? ______ hours

   (d) how much time did you spend in the office? ______ hours

   (e) how much time did you spend on lunch and/or tea break? ______ hours

   (f) how much time did you spend on other work activities? ______ hours
   (Please specify those activities: ____)

4. **On the Last Day that you worked**,

   (a) how many of your patients used a cane? ______ patients

   (b) how many of your patients used a walker? ______ patients

   (c) how many of your patients used a wheelchair? ______ patients

5. Please **tick the box** on the nursing procedures that you performed on the **Last Day that you worked** and state how many times (**Frequency**) you performed them and for how long (Total number of minutes during your last workday, i.e. **Total Duration**).

Nursing Activities	Frequency	Total Duration
1☐ Comprehensive assessment	_______ times	_______ minutes
2☐ Simple assessment	_______ times	_______ minutes
3☐ Drug administration and supervision	_______ times	_______ minutes
4☐ Specimen collection and testing	_______ times	_______ minutes
5☐ Exercise – mobility, breathing	_______ times	_______ minutes
6☐ Counseling	_______ times	_______ minutes
7☐ Health education	_______ times	_______ minutes
8☐ Wound care/drain care	_______ times	_______ minutes
9☐ Feeding tube care	_______ times	_______ minutes
10☐ Urinary catheter care	_______ times	_______ minutes
11☐ Ostomy care	_______ times	_______ minutes
12☐ IV catheter care	_______ times	_______ minutes
13☐ Renal care (add medication and wound care)	_______ times	_______ minutes
14☐ Postnatal and infant care	_______ times	_______ minutes
15☐ Special baby care	_______ times	_______ minutes
16☐ Hospice care/terminal care	_______ times	_______ minutes
17☐ Pulmonary care	_______ times	_______ minutes
18☐ Cardiac care	_______ times	_______ minutes
19☐ Diabetic care	_______ times	_______ minutes
20☐ Measuring vital signs	_______ times	_______ minutes
21☐ Others (Please specify those activities)		
	_______ times	_______ minutes
	_______ times	_______ minutes
	_______ times	_______ minutes

6. **__On the Last Day that you worked__, how many times** did you perform the following activities:

(Use the following numbers to answer the questions)

0 1 2 3 4 5 6 7 8 9 10 10+

(a) Reposition or pull up a patient in bed ___________ times
(b) Reposition or pull up a patient in a wheelchair/chair ___________ times
(c) Transfer a patient in and out of bed ___________ times
(d) Transfer a patient in and out of a wheelchair/chair ___________ times
(e) Transfer a patient in and out of a bathroom ___________ times
(f) Transfer a patient on and off the toilet ___________ times
(g) Dress or feed a patient ___________ times
(h) Manipulate extremities ___________ times
(i) Transfer a patient more than 100 pounds? ___________ times
(j) Reposition/move/pull up a patient more than 100 pounds? ___________ times

7. **__On the Last Day that you worked__, how often** did you perform the following activities:

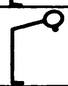
(a) Lifting, pushing, pulling or carrying with your trunk in an upright posture

	never	seldom	sometimes	often	very often
Light force (up to 25 lbs.)	☐	☐	☐	☐	☐
Moderate force (25-50 lbs.)	☐	☐	☐	☐	☐
Strong force (more than 50 lbs.)	☐	☐	☐	☐	☐

(b) Lifting, pushing, pulling or carrying with your trunk in a bent position

	never	seldom	sometimes	often	very often
Light force (up to 25 lbs.)	☐	☐	☐	☐	☐
Moderate force (25-50 lbs.)	☐	☐	☐	☐	☐
Strong force (more than 50 lbs.)	☐	☐	☐	☐	☐

8. Think about **the LAST DAY that you worked**. How much time did you spend doing the following activities in **patients' homes or nursing home?**

Activities	**Patients' or nursing home**					
	Almost Never	About 10% of the time	About 25% of the time	About half of the time	About 75% of the time	Almost all the time
a. Pushing or pulling loads	☐	☐	☐	☐	☐	☐
b. Lifting or carrying objects	☐	☐	☐	☐	☐	☐
c. Walking	☐	☐	☐	☐	☐	☐
d. Climbing stairs	☐	☐	☐	☐	☐	☐
e. Walking on slippery or uneven surfaces (e.g. wet floor)	☐	☐	☐	☐	☐	☐
f. Working from an unadjustable height (e.g., furniture too high or too low)	☐	☐	☐	☐	☐	☐
g. Working in limited working spaces	☐	☐	☐	☐	☐	☐
h. Working with insufficient lighting	☐	☐	☐	☐	☐	☐
i. Working without sufficient lifting or transferring devices	☐	☐	☐	☐	☐	☐
j. Bent half-way forward (about 45°) for prolonged periods 	☐	☐	☐	☐	☐	☐
k. Bent very forward (about 75°) for prolonged periods 	☐	☐	☐	☐	☐	☐
l. Prolonged twisting or rotation 	☐	☐	☐	☐	☐	☐
m. Prolonged bending to the side 	☐	☐	☐	☐	☐	☐
n. Prolonged squatting (with or without stool) 	☐	☐	☐	☐	☐	☐
o. Prolonged kneeling (on one or both knees) 	☐	☐	☐	☐	☐	☐

9. Think about **the LAST DAY that you worked**. **How much time** did you spend doing the following activities **on the road** (i.e. traveling time)?

Activities	**On the Road**					
	Almost Never	About 10% of the time	About 25% of the time	About half of the time	About 75% of the time	Almost all the time
a. Pushing or pulling loads	☐	☐	☐	☐	☐	☐
b. Lifting or carrying objects	☐	☐	☐	☐	☐	☐
c. Sitting	☐	☐	☐	☐	☐	☐
d. Standing	☐	☐	☐	☐	☐	☐
e. Walking	☐	☐	☐	☐	☐	☐
f. Climbing stairs	☐	☐	☐	☐	☐	☐
g. Walking on slippery or uneven surfaces (e.g. rainy days)	☐	☐	☐	☐	☐	☐
h. Riding in motor vehicles (e.g. buses, trains)	☐	☐	☐	☐	☐	☐
i. Prolonged or sustained posture (i.e. maintaining a fixed position, such as prolonged bending forward or awkward postures)	☐	☐	☐	☐	☐	☐

10. Think about **the LAST DAY that you worked**. **How much time** did you spend doing the following activities in **the office?**

Activities	**In the Office**					
	Almost Never	About 10% of the time	About 25% of the time	About half of the time	About 75% of the time	Almost all the time
a. Pushing or pulling loads	☐	☐	☐	☐	☐	☐
b. Lifting or carrying objects	☐	☐	☐	☐	☐	☐
c. Sitting	☐	☐	☐	☐	☐	☐
d. Standing	☐	☐	☐	☐	☐	☐
e. Kneeling or squatting	☐	☐	☐	☐	☐	☐
f. Walking	☐	☐	☐	☐	☐	☐
g. Walking on slippery or uneven surfaces (e.g. wet floor)	☐	☐	☐	☐	☐	☐
h. Working in limited working spaces	☐	☐	☐	☐	☐	☐
i. Working with insufficient lighting	☐	☐	☐	☐	☐	☐
j. Prolonged or sustained posture (i.e. maintaining a fixed position, such as prolonged bending forward or awkward postures)	☐	☐	☐	☐	☐	☐

Section II Your Musculoskeletal Problems

During the last 12 months, have you had pain in any of the following body part(s)?	Instruction: Please check the appropriate boxes
11. Neck ₀☐ No ₁☐ Yes ☛	If YES, is the pain caused or aggravated by your work? 0☐ No 1☐ Yes ☛ **If YES**, list the work activities that you think contributed to your pain:
12. Shoulders 0☐ No 1☐ Yes ☛	If YES, is the pain caused or aggravated by your work? 0☐ No 1☐ Yes ☛ **If YES**, list the work activities that you think contributed to your pain:
13. Upper back 0☐ No 1☐ Yes ☛	If YES, is the pain caused or aggravated by your work? 0☐ No 1☐ Yes ☛ **If YES**, list the work activities that you think contributed to your pain:
14. Lower back 0☐ No 1☐ Yes ☛	If YES, is the pain caused or aggravated by your work? 0☐ No 1☐ Yes ☛ **If YES**, list the work activities that you think contributed to your pain:
15. Elbows 0☐ No 1☐ Yes ☛	If YES, is the pain caused or aggravated by your work? 0☐ No 1☐ Yes ☛ **If YES**, list the work activities that you think contributed to your pain:
16. Wrists or Hands 0☐ No 1☐ Yes ☛	If YES, is the pain caused or aggravated by your work? 0☐ No 1☐ Yes ☛ **If YES**, list the work activities that you think contributed to your pain:
17. Hips or Thighs 0☐ No 1☐ Yes ☛	If YES, is the pain caused or aggravated by your work? 0☐ No 1☐ Yes ☛ **If YES**, list the work activities that you think contributed to your pain:
18. Knees 0☐ No 1☐ Yes ☛	If YES, is the pain caused or aggravated by your work? 0☐ No 1☐ Yes ☛ **If YES**, list the work activities that you think contributed to your pain:
19. Ankles or Feet 0☐ No 1☐ Yes ☛	If YES, is the pain caused or aggravated by your work? 0☐ No 1☐ Yes ☛ **If YES**, list the work activities that you think contributed to your pain:

Section III Your Back Problems

Instructions:

(a) <u>IF YOU HAVE NOT HAD ANY</u> Upper and Lower Back Pain in the last 12 months (i.e., if you answered "NO" to Questions 13 AND 14 on Page 7), PLEASE SKIP TO QUESTION #28 ON PAGE 9.

(b) <u>HOWEVER, IF YOU HAVE EXPERIENCED ANY</u> Upper or Lower Back Pain in the last 12 months (i.e., You answered "YES" to Questions 13 OR 14 on page 7), then please ANSWER QUESTIONS 20 through 24.

20. Has your back problem(s) ever caused you to reduce your leisure activity during the last 12 months?

$_0$☐ No
$_1$☐ Yes

21. Has your back problem(s) ever caused you to reduce your work activity during the last 12 months?

$_0$☐ No
$_1$☐ Yes

22. Please estimate the number of sickness/absence days that you have taken due to your back problem(s) during the last 12 months. __________ days

23. During the Last 12 months, have you been seen by any of the following health practitioners because of your back problem(s)? If so, please check which kind of practitioner and indicate how many visits you have had with each practitioner.

☐ Doctor: ☛ Number of visits _______

☐Physiotherapy: ☛ Number of visits ____

☐ Chiropractor: ☛ Number of visits _____

☐ Others ______________: ☛ Number of visits ____

24. **During the last 4 weeks**, have you had back pain?

$_0$☐ No ☛ **GO TO Question # 27 (next page)**
$_1$☐ Yes ☛ **GO TO Questions # 25 and 26**

25. In general, how severe has your back pain been in the last 4 weeks?

$_0$☐ Slight
$_1$☐ Moderate
$_2$☐ Severe
$_3$☐ Very severe

26. The following 12 questions are about how much your back pain has interfered with your daily life **during the last 4 weeks.** ***(Please check the appropriate box)***

Questions	Not At All (0)	A little (1)	Moderately (2)	Very much (3)	Extremely (4)
a. How much does your back problem(s) interfere with the use of your hands, arms, or legs?	0☐	1☐	2☐	3☐	4☐
b. How much does your back problem(s) interfere with the use of your back?	0☐	1☐	2☐	3☐	4☐
c. How much does your back problem(s) interfere with your work at home?	0☐	1☐	2☐	3☐	4☐
d. How much does your back problem(s) interfere with your bathing, dressing, toileting, or other personal care?	0☐	1☐	2☐	3☐	4☐
e. How much does your back problem(s) interfere with your sleep and rest?	0☐	1☐	2☐	3☐	4☐
f. How much does your back problem(s) interfere with your leisure or recreational activities?	0☐	1☐	2☐	3☐	4☐
g. How much does your back problem(s) interfere with your relationships with friends, family, or other important people in your life?	0☐	1☐	2☐	3☐	4☐
h. How much does your back problem(s) interfere with your thinking, concentrating, or remembering?	0☐	1☐	2☐	3☐	4☐
i. How much does your back problem(s) interfere with your adjusting or coping with your back pain/injury?	0☐	1☐	2☐	3☐	4☐
j. How much does your back problem(s) interfere with your usual paid work?	0☐	1☐	2☐	3☐	4☐
k. How much does your back problem interfere with activities so that you become dependent on others?	0☐	1☐	2☐	3☐	4☐
l. How much does your back problem interfere with activities due to stiffness and pain?	0☐	1☐	2☐	3☐	4☐

27. **In general**, how much does your back pain distress you?

0☐ Not at all
1☐ A little
2☐ Moderately
3☐ Very much
4☐ Extremely

Please answer the following 2 questions:

28. What useful strategies have been used in your centre to reduce the likelihood of staff developing musculoskeletal problems?

29. In your opinion, what still needs to be done in your centre to reduce the likelihood of staff developing musculoskeletal problems?

Section IV Your Job Situation

30. The following questions are about **your job at work**. For some of these questions, you may find it difficult to choose the "correct" answer. Please ***CHECK*** the box which <u>best</u> describes the extent to which you agree or disagree with the following statements:

	Strongly disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
a. My job requires that I learn new things.	1☐	2☐	3☐	4☐
b. My job involves a lot of repetitive work.	1☐	2☐	3☐	4☐
c. My job requires me to be creative.	1☐	2☐	3☐	4☐
d. My job requires a high level of skill.	1☐	2☐	3☐	4☐
e. I get to do a variety of different things on my job.	1☐	2☐	3☐	4☐
f. I have an opportunity to develop my own special abilities.	1☐	2☐	3☐	4☐
g. My job allows me to make a lot of decisions on my own.	1☐	2☐	3☐	4☐
h. On my job, I have little freedom to decide how I do my work.	1☐	2☐	3☐	4☐
i. I have a lot of say about what happens on my job.	1☐	2☐	3☐	4☐
j. My job requires working very fast.	1☐	2☐	3☐	4☐
k. My job requires working very hard.	1☐	2☐	3☐	4☐
l. I am not asked to do an excessive amount of work.	1☐	2☐	3☐	4☐
m. I have enough time to get the job done.	1☐	2☐	3☐	4☐
n. I am free from conflicting demands that others make.	1☐	2☐	3☐	4☐
o. My job requires long periods of intense concentration on the task.	1☐	2☐	3☐	4☐
p. My tasks are often interrupted before they can be completed, requiring attention at a later time.	1☐	2☐	3☐	4☐
q. My job is very hectic.	1☐	2☐	3☐	4☐
r. Waiting on work from other people or departments often slows me down on my job.	1☐	2☐	3☐	4☐
s. My supervisor is concerned about the welfare of those under her/him.	1☐	2☐	3☐	4☐
t. My supervisor pays attention to what I am saying.	1☐	2☐	3☐	4☐
u. I am exposed to hostility or conflict from my supervisor.	1☐	2☐	3☐	4☐
v. My supervisor is helpful in getting the job done.	1☐	2☐	3☐	4☐
w. My supervisor is successful in getting people to work together.	1☐	2☐	3☐	4☐
x. People I work with are competent in doing their jobs	1☐	2☐	3☐	4☐
y. People I work with take an interest in me.	1☐	2☐	3☐	4☐
z. I am exposed to hostility or conflict from the people I work with.	1☐	2☐	3☐	4☐

	Strongly disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
aa. People I work with are friendly.	1☐	2☐	3☐	4☐
bb. The people I work with encourage each other to work together.	1☐	2☐	3☐	4☐
cc. People I work with are helpful in getting the job done	1☐	2☐	3☐	4☐
dd. Patients and family members I work with take an interest in me.	1☐	2☐	3☐	4☐
ee. I am exposed to hostility or conflict from patients and family members with whom I work.	1☐	2☐	3☐	4☐
ff. Patients and family members I work with are friendly.	1☐	2☐	3☐	4☐
gg. Patients and family members I work with encourage each other to work together.	1☐	2☐	3☐	4☐
hh. Patients and family members I work with are helpful in getting the job done.	1☐	2☐	3☐	4☐
ii. My job requires me to walk very fast.	1☐	2☐	3☐	4☐
jj. My job requires lots of physical effort.	1☐	2☐	3☐	4☐
kk. I am often required to move or lift very heavy loads on my job	1☐	2☐	3☐	4☐
ll. My work requires rapid and continuous physical activity	1☐	2☐	3☐	4☐
mm. I am often required to work for long periods with my body in physically awkward positions.	1☐	2☐	3☐	4☐
nn. I am required to work for long periods with my head or arms in physically awkward positions.	1☐	2☐	3☐	4☐
oo. I can talk to colleagues during breaks.	1☐	2☐	3☐	4☐
pp. I can leave my job to talk with colleagues.	1☐	2☐	3☐	4☐
qq. I can interact with colleagues as part of my work.	1☐	2☐	3☐	4☐
rr. I can socialize with colleagues outside of the workplace.	1☐	2☐	3☐	4☐
ss. I have socialized with a colleague outside the workplace during the last 6 months.	1☐	2☐	3☐	4☐

Your Work at Home

	Strongly disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)	Not applicable (5)
tt. I need to do domestic work after going home.	1☐	2☐	3☐	4☐	5☐
uu. I need to take care of my children.	1☐	2☐	3☐	4☐	5☐
vv. I need to take care of my elderly parents or relatives.	1☐	2☐	3☐	4☐	5☐
ww. My domestic work is hectic.	1☐	2☐	3☐	4☐	5☐
xx. My spouse is helpful in getting the domestic work done.	1☐	2☐	3☐	4☐	5☐

Section V Your Personal Information

(Please fill in your answers to the questions or check the appropriate box)

31. Are you male or female? 0☐ Male 1☐ Female

32. What is your age? ______Years

33. What is your marital status?
    1☐ Single
    2☐ Married
    3☐ Divorced/Separated
    4☐ Widowed
    5☐ Other (SPECIFY: ________________)

34. What is your height? __________ cm or ____feet____inches

35. What is your weight? __________kg or ________lbs

36. How many years have you been actively practising nursing?___________ years

37. How many years have you been actively practising in community nursing? _____ years

38. What services do you provide?
    1☐ Community nursing services
    2☐Community psychiatric nursing services

39. What current nursing position do you hold?
    1☐Manager
    2☐Nursing Officer
    3☐Nurse Specialist
    4☐Registered Nurse
    5☐Enrolled Nurse
    6☐Other (SPECIFY: ________________)

40. What is your professional education?
    1☐Enrolled Nurse
    2☐Diploma in Nursing
    3☐Bachelor of Science in Nursing
    4☐Other (SPECIFY: ____________________)

41. How many children living with you need your care? ______ children

42. How many adults living with you need elder care or disability care? ________ adults

43. In your family, who helps with the domestic work? **(Check all that apply)**

$_1$□ Maid $_2$□ Yourself $_3$□ Spouse $_4$□ Other (SPECIFY: ________________)

44. What is your current personal income before taxes? $____________ per month

45. What is your current family income before taxes? $ _______ per month

Please answer the following 3 questions about Severe Atypical Respiratory Syndrome (SARS):

46. What is your risk of contracting SARS from your work?

$_0$□ No Risk $_1$□ Low Risk $_2$□ Medium Risk $_3$□ High Risk

47. What useful precautions have been used in your centre to reduce your risk of contracting SARS?

48. In your opinion, what precautions still need to be taken to reduce your risk of contracting SARS?

****

Any additional comments you may wish to make are welcome:

____

____

____

____

____

____

THANK YOU FOR TAKING THE TIME
TO COMPLETE THIS QUESTIONNAIRE

In order to develop an effective program to reduce work-related back problems, more research will be needed. If you wish to be contacted about a future study, please provide the following information. Your personal information will be kept confidential. Your participation is sincerely appreciated. Thank you for your contribution.

Name: ______________________________

Contact phone#: ________________________

Email address: ________________________

背景資料

各社康護理人員：

本人名爲張健，是美國三藩市加州大學護理學系的畢業生，現爲香港理工大學護理學院的教員。本人現正爲香港社康護理人員進行一項「與工作有關的背部問題」研究。此項研究目的在於找出您在工作上所出現的背部問題，並詳述背部問題的廣泛程度及危機因素。預計此研究的結果將大大提高護理工作人員對背部問題的關注；亦可協助社康護理人員發展背部創傷預防計劃。

本人邀請您參與此研究，包括填妥所附之問卷調查，並交還予本人或研究助理。完成此問卷調查約需時**三十分鐘**。

此研究屬自願參與性質，若吾等收到您填妥的問卷，則代表您同意參與此研究。**切勿**在問卷上寫上您的姓名。所有回應均以不記名方式收回，資料亦會絕對保密。

若您願意在將來參與關於此種題材的研究，請填妥問卷的最後一頁，並提供您的姓名、電郵地址及電話號碼，並把此頁撕下，然後放在附帶的信封裡。請與問卷**分開**交還。

若您對此研究內容有任何投訴，請親身或以書面聯絡香港理工大學「人類實驗對象操守小組委員會」的秘書 Mr. Eric Chan (由大學人事部轉交)。

若您在填寫問卷時有任何問題，請隨時聯絡本人或研究助理。若您需要關於此研究更詳細的資料，請撥 2766-6773 或透過電郵地址 hskin@inet.polyu.edu.hk 聯絡本人。

非常感謝您參與此問卷調查。

順頌

大安

張健, RN, MN, Ph.D. Candidate

第一部份　您的工作量

(請把您的答案寫在底線上的空間)

1. 想想您**正常的工作時間**。平均來說

   (a)您的**常規工作時間 (不包括超時工作)** 每星期有幾小時？　每星期________ 小時

   (b)您的**有薪超時工作**平均每星期有幾小時？ 每星期_________小時

   (c)您的**無薪但有假期補償的超時工作**平均每星期有幾小時？ 每星期_________小時

   (d) 您的**無薪及無假期補償的超時工作**平均每星期有幾小時？ 每星期_________小時

第 2 至 10 題，請用*上一個工作天* 回答問題

2. 想想您*上一個工作天*的工作時間，

   (a) 您的**常規工作時間 (不包括超時工作)** 有幾小時？ ________ 小時

   (b) 您的**有薪超時工作**有幾小時？ _________ 小時

   (c) 您的**無薪但有假期補償的超時工作**有幾小時？ _________ 小時

   (d) 您的**無薪及無假期補償的超時工作**有幾小時？ _________ 小時

3. 想想您*上一個工作天*的工作內容，
   (若您的答案是「少於一小時」，請用「¼ 小時」來代替「十五分鐘」；「½ 小時」來代替「三十分鐘」)

   (a) 您探訪過多少位病人？ ________ 位病人

   (b) 您在病人家裡或護老院逗留了多長時間？ ______ 小時

   (c) 您在路途上 (即交通時間) 花了多少時間？ ______ 小時

   (d) 您在辦公室逗留了多長時間？ ______ 小時

   (e) 您吃午飯和/或下午茶花了多少時間？ ______ 小時

   (f) 您花在其他與工作有關的活動有多長時間？ ______ 小時

   (請註明這些活動的內容：____)

4. 在您*上一個工作天*，

   (a) 您有多少位病人用手杖？ ______ 位病人

   (b) 您有多少位病人用助行架？ ______位病人

   (c) 您有多少位病人用輪椅？ ______位病人

5. 請選擇在***上一個工作天***所進行的護理 程序***(請在適當的空格內, 加上✓號)***，
並列出其次 數**(頻密度)** 及一天之內一共維持了多長時間 **(總持續時間)**。

護理程序	**頻密度**	**總持續時間**
1☐ 全面性護理評估	______ 次	______ 分鐘
2☐ 簡易護理評估	______次	______分鐘
3☐ 給予藥物與藥物指導	______次	______分鐘
4☐ 樣本收集與測試	______次	______分鐘
5☐ 運動– 走動、呼吸	______次	______分鐘
6☐ 輔導服務	______次	______分鐘
7☐ 健康教育	______次	______分鐘
8☐ 傷口護理/引流護理	______次	______分鐘
9☐ 餵飼管護理	______次	______分鐘
10☐ 導尿管護理	______次	______分鐘
11☐ 造口護理	______次	______分鐘
12☐ 靜脈輸入導管護理	______次	______分鐘
13☐ 腎臟疾病護理 (附加藥物及傷口護理)	______次	______分鐘
14☐ 產後及幼兒護理	______次	______分鐘
15☐ 特別嬰兒護理	______次	______分鐘
16☐ 善終服務/末期疾病護理	______次	______分鐘
17☐ 肺部疾病護理	______次	______分鐘
18☐ 心臟疾病護理	______次	______分鐘
19☐ 糖尿病護理	______次	______分鐘
20☐ 測量生命表徵	______次	______分鐘
21☐ 其他 ***(請註明這些護理程序)***		
	______次	______分鐘
	______次	______分鐘
	______次	______分鐘

6. 在*上一個工作天*，您進行以下的程序**一共有多少次**？

(請利用以下的數字來回答問題)

0 1 2 3 4 5 6 7 8 9 10 10+

(a) 爲躺在床上的病人調整位置或拉起病人 ____________ 次

(b) 爲坐在輪椅/椅子上的病人調整位置或拉起病人 ____________次

(c) 移動病人上落床 ____________次

(d) 移動病人離開及返回輪椅/椅子上 ____________次

(e) 移動病人進出浴室 ____________次

(f) 移動病人進出洗手間 ____________次

(g) 協助病人穿衣或飲食 ____________次

(h) 移動病人四肢 ____________次

(i) 移動體重超過 100 磅的病人 ____________次

(j) 調整位置 /拉起/移動體重超過 100 磅的病人____________次

7. 在*上一個工作天*，您進行以下的動作有**多頻密**？ ***(請在適當的空格內, 加上✓號)***

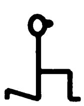
(a) 在您軀體挺直的姿勢下，抬起、推動、拉起或攜帶物件時所需的

	從不	很少	間中	較多	經常
重量或力度較輕 (最多 25 磅)	☐	☐	☐	☐	☐
重量或力度中等 (25-50 磅)	☐	☐	☐	☐	☐
較重或力度較強 (多於 50 磅)	☐	☐	☐	☐	☐

(b) 在您彎腰的姿勢下，抬起、推動、拉起或攜帶物件時所需的

	從不	很少	間中	較多	經常
重量或力度較輕 (最多 25 磅)	☐	☐	☐	☐	☐
重量或力度中等 (25-50 磅)	☐	☐	☐	☐	☐
較重或力度較強 (多於 50 磅)	☐	☐	☐	☐	☐

8. 想想您在***上一個工作天***中，花了多少時間**在病人家裡或護老院中**進行以下活動？

活動	在病人家裡或護老院中					
	幾乎從沒有	大概 10%的時間	大概 25%的時間	大概一半的時間	大概 75%的時間	經常
a. 推或拉物件	☐	☐	☐	☐	☐	☐
b. 抬起或攜帶物件	☐	☐	☐	☐	☐	☐
c. 走路	☐	☐	☐	☐	☐	☐
d. 爬樓梯	☐	☐	☐	☐	☐	☐
e. 在滑溜或不平坦的表面走動(如濕滑的地面)	☐	☐	☐	☐	☐	☐
f. 在傢俱不能調較高度的情況下工作(如過高或過矮的傢俬)	☐	☐	☐	☐	☐	☐
g. 在有限的空間內工作	☐	☐	☐	☐	☐	☐
h. 在不充足的光線下工作	☐	☐	☐	☐	☐	☐
i. 在抬物設備或移動設備不足的環境下工作	☐	☐	☐	☐	☐	☐
j. 長時間向前彎腰 (大約 45°) 	☐	☐	☐	☐	☐	☐
k. 長時間向前大幅度彎腰 (大約 75°) 	☐	☐	☐	☐	☐	☐
l. 長時間扭曲身體或轉動身體 	☐	☐	☐	☐	☐	☐
m. 長時間向側面彎腰 	☐	☐	☐	☐	☐	☐
n. 長時間蹲坐 (有或沒有坐在小凳子上) 	☐	☐	☐	☐	☐	☐
o. 長時間跪下 (一邊膝蓋或兩邊膝蓋) 	☐	☐	☐	☐	☐	☐

9. 想想您在*上一個工作天*中，花了**多少時間在路途上**(即交通時間)進行以下活動？

活動	在路上					
	幾乎從沒有	大概 10%的時間	大概 25%的時間	大概一半的時間	大概 75%的時間	經常
a. 推或拉物件	☐	☐	☐	☐	☐	☐
b. 抬起或攜帶物件	☐	☐	☐	☐	☐	☐
c. 坐下	☐	☐	☐	☐	☐	☐
d. 站立	☐	☐	☐	☐	☐	☐
e. 走路	☐	☐	☐	☐	☐	☐
f. 爬樓梯	☐	☐	☐	☐	☐	☐
g. 在滑漉或不平坦的表面走動 (如下雨天)	☐	☐	☐	☐	☐	☐
h. 在交通工具上 (如巴士、火車等)	☐	☐	☐	☐	☐	☐
i. 長時間或持續維持某姿勢 (即維持一個固定的動作，如長時間彎腰或做彆扭的動作)	☐	☐	☐	☐	☐	☐

10. 想想您在*上一個工作天*中，花了**多少時間在辦公室裡**進行以下活動？

活動	在辦公室裡					
	幾乎從沒有	大概 10%的時間	大概 25%的時間	大概一半的時間	大概 75%的時間	經常
a. 推或拉物件	☐	☐	☐	☐	☐	☐
b. 抬起或攜帶物件	☐	☐	☐	☐	☐	☐
c. 坐下	☐	☐	☐	☐	☐	☐
d. 站立	☐	☐	☐	☐	☐	☐
e. 跪下或蹲坐	☐	☐	☐	☐	☐	☐
f. 走路	☐	☐	☐	☐	☐	☐
g. 在滑漉或不平坦的表面走動(如濕滑的地面)	☐	☐	☐	☐	☐	☐
h. 在有限的空間內工作	☐	☐	☐	☐	☐	☐
i. 在不充足的光線下工作	☐	☐	☐	☐	☐	☐
j. 長時間或持續維持某姿勢 (即維持一個固定的動作，如長時間彎腰或做彆扭的動作)	☐	☐	☐	☐	☐	☐

第二部份　　您的肌肉及骨骼問題

在*過去十二個月內*，您有否在以下任何的身體部份感覺痛楚？	指引：*請把答案在適當的方格打上「√」號*
11. 頸部　0□ 沒有　1□ 有 ☛ (在過去十二個月內)	若答案是「有」，痛楚是否由工作引起或加劇？ 0□ 否　1□ 是☛ 若答案爲「是」，請列出您認爲導致痛楚的工作活動：
12. 肩膀　0□ 沒有　1□ 有 ☛ (在過去十二個月內)	若答案是「有」，痛楚是否由工作引起或加劇？ 0□ 否　1□ 是☛ 若答案爲「是」，請列出您認爲導致痛楚的工作活動：
13. 背部上方　0□ 沒有　1□ 有 ☛ (在過去十二個月內)	若答案是「有」，痛楚是否由工作引起或加劇？ 0□ 否　1□ 是☛ 若答案爲「是」，請列出您認爲導致痛楚的工作活動：
14. 背部下方　0□ 沒有　1□ 有 ☛ (在過去十二個月內)	若答案是「有」，痛楚是否由工作引起或加劇？ 0□ 否　1□ 是☛ 若答案爲「是」，請列出您認爲導致痛楚的工作活動：
15. 手肘　0□ 沒有　1□ 有 ☛ (在過去十二個月內)	若答案是「有」，痛楚是否由工作引起或加劇？ 0□ 否　1□ 是☛ 若答案爲「是」，請列出您認爲導致痛楚的工作活動：
16. 手腕或手部　0□ 沒有　1□ 有 ☛ (在過去十二個月內)	若答案是「有」，痛楚是否由工作引起或加劇？ 0□ 否　1□ 是☛ 若答案爲「是」，請列出您認爲導致痛楚的工作活動：
17. 臀部或大腿　0□ 沒有　1□ 有 ☛ (在過去十二個月內)	若答案是「有」，痛楚是否由工作引起或加劇？ 0□ 否　1□ 是☛ 若答案爲「是」，請列出您認爲導致痛楚的工作活動：
18. 膝蓋　0□ 沒有　1□ 有 ☛ (在過去十二個月內)	若答案是「有」，痛楚是否由工作引起或加劇？ 0□ 否　1□ 是☛ 若答案爲「是」，請列出您認爲導致痛楚的工作活動：
19. 腳踝或腳部　0□ 沒有　1□ 有 ☛ (在過去十二個月內)	若答案是「有」，痛楚是否由工作引起或加劇？ 0□ 否　1□ 是☛ 若答案爲「是」，請列出您認爲導致痛楚的工作活動：

第三部份　　您的背部問題

指引：若您在 過去的十二個月，

(a) 從未出現過任何背部上方和背部下方的痛楚 (即是您在第 7 頁的第 13 題和 14 題的答案均爲「沒有」)，請跳到第 9 頁的第 28 題。

(b)曾經出現過任何背部上方或背部下方的痛楚 (即是您在第 7 頁的第 13 題或 14 題的答案爲「有」)，均請回答第 20 題至 24 題。

(請在適當的空格內, 加上✓號)

20. 您的背部問題有否在 過去十二個月 內使您的消閒活動減少？

0□ 沒有
1□ 有

21. 您的背部問題有否在 過去十二個月 內使您的工作活動減少？

0□ 沒有
1□ 有

22. 請估計在 過去十二個月 內您因背部問題而申請病假或缺席的日數 __________ 日

23. 在 過去十二個月內，您有否因背部問題而求診過醫護人員？若有，請選擇哪一類醫護人員 ***(請在適當的空格內, 加上✓號)***，並填寫求診的次數。

□ 醫生：☛求診次數 _______

□ 物理治療師：☛求診次數________

□ 脊椎治療師：☛求診次數________

□ 其他 ***(請註明哪類醫護人員)*** __________________________ ： ☛求診次數 ________

第 24 至 26 題，請用*過去四星期內*回答問題

24. 在*過去四星期內*，您有否出現背痛？

0□ 沒有　　**☛ 跳到第 27 題 (下一頁)**
1□ 有　　**☛ 跳到第 25 題及 26 題**

25. **一般來說**，在 *過去四星期內* 您的背部痛楚程度有多嚴重？

0□ 輕微
1□ 中度
2□ 嚴重
3□ 非常嚴重

26. 以下十二個問題是關於您 ***在過去四星期內*** 出現的背痛怎樣阻礙您的日常生活。
(請在適當的空格內, 加上✔號)

問題	大致沒有 (0)	少許 (1)	中等 (2)	非常大 (3)	極大 (4)
a. 您的背部問題阻礙您運用手部、手臂、腿部有多大？	0□	1□	2□	3□	4□
b. 您的背部問題阻礙您運用背部有多大？	0□	1□	2□	3□	4□
c. 您的背部問題阻礙您在家工作有多大？	0□	1□	2□	3□	4□
d. 您的背部問題阻礙您洗澡、穿衣、上洗手間及其他個人護理有多大？	0□	1□	2□	3□	4□
e. 您的背部問題阻礙您睡眠與休息多大？	0□	1□	2□	3□	4□
f. 您的背部問題阻礙您進行消閒或康樂活動有多大？	0□	1□	2□	3□	4□
g. 您的背部問題阻礙您跟朋友、家人、其他您重視的人的關係有多大？	0□	1□	2□	3□	4□
h. 您的背部問題阻礙您的思想、專注力、記憶力有多大？	0□	1□	2□	3□	4□
i. 您的背部問題阻礙您適應或應付背部痛楚或損傷有多大？	0□	1□	2□	3□	4□
j. 您的背部問題阻礙您平常的有薪工作有多大？	0□	1□	2□	3□	4□
k. 您的背部問題阻礙您的日常活動而致您漸漸需要倚賴他人有多大？	0□	1□	2□	3□	4□
l. 您的背部問題所產生的肌肉僵硬和痛楚情況阻礙您的日常活動有多大？	0□	1□	2□	3□	4□

27. **一般來說**，您的背部痛楚苦惱您多少？

0□ 大致沒有
1□ 少許
2□ 中等
3□ 非常
4□ 極度

請回答下列兩條問題:

28. 在您的中心採用了甚麼有效方法減少職員產生肌肉及骨骼受傷問題?

29. 您認爲您的中心還需要做些甚麼來減少職員產生肌肉及骨骼受傷問題?

第四部份　您的一般工作情況

30. 以下問題是關於**您的 一般 工作情況**。對於以下某些問題，您可能難以選擇「正確」的答案。請把最能形容您對下列句子的同意或不同意的程度，**在適當方格內打上「√」號**：

	非常不同意 (1)	不同意 (2)	同意 (3)	非常同意 (4)
a. 我的工作要求我學習新事物。	1☐	2☐	3☐	4☐
b. 我的工作涉及很多重複的工序。	1☐	2☐	3☐	4☐
c. 我的工作要求我具備創意。	1☐	2☐	3☐	4☐
d. 我的工作要求我有高度技巧。	1☐	2☐	3☐	4☐
e.我需在工作上處理不同種類的事務。	1☐	2☐	3☐	4☐
f. 我有機會發展個人的特別技能。	1☐	2☐	3☐	4☐
g. 我的工作容許我有很大的決策權。	1☐	2☐	3☐	4☐
h. 在我的工作中，我有很少自由決定如何做我的工作。	1☐	2☐	3☐	4☐
i. 對於我的工作情況我有很大發言權。	1☐	2☐	3☐	4☐
j. 我的工作要求我做事很迅速。	1☐	2☐	3☐	4☐
k. 我的工作要求我做事很勤奮。	1☐	2☐	3☐	4☐
l. 我沒有被要求做過量的工作。	1☐	2☐	3☐	4☐
m. 我有充足時間完成工作。	1☐	2☐	3☐	4☐
n. 我沒有遇上其他人對我作出互相矛盾的要求。	1☐	2☐	3☐	4☐
o. 我的工作要求長時間對工序高度集中。	1☐	2☐	3☐	4☐
p. 我的工序常在完成之前被打斷，而需在稍後時間再度專注。	1☐	2☐	3☐	4☐
q. 我的工作是非常忙亂的。	1☐	2☐	3☐	4☐
r. 等候其他人或其他部門工作經常拖慢我的進度。	1☐	2☐	3☐	4☐
s. 我的上司關注他/她下屬的福利。	1☐	2☐	3☐	4☐
t. 我的上司留意我所講的說話。	1☐	2☐	3☐	4☐
u. 我的上司對我有敵意而且工作上有衝突。	1☐	2☐	3☐	4☐
v. 我的上司在我完成工作方面很幫得上忙。	1☐	2☐	3☐	4☐
w. 我的上司在維繫各人合作方面很成功。	1☐	2☐	3☐	4☐
x. 和我工作的人有足夠的能力勝任他們的工作。	1☐	2☐	3☐	4☐
y. 和我工作的人很關心我個人的情況。	1☐	2☐	3☐	4☐

	非常不同意 (1)	不同意 (2)	同意 (3)	非常同意 (4)
z. 和我工作的人對我有敵意而且工作上有衝突。	1☐	2☐	3☐	4☐
aa. 和我工作的人都友善。	1☐	2☐	3☐	4☐
bb. 和我工作的人互相鼓勵合力工作。	1☐	2☐	3☐	4☐
cc. 和我工作的人在我完成工作方面很幫得上忙。	1☐	2☐	3☐	4☐
dd. 病人與他們的家人很關心我個人的情況。	1☐	2☐	3☐	4☐
ee. 病人與他們的家人對我有敵意而且工作上有衝突。	1☐	2☐	3☐	4☐
ff. 病人與他們的家人都友善。	1☐	2☐	3☐	4☐
gg. 病人與他們的家人都互相鼓勵合力工作。	1☐	2☐	3☐	4☐
hh. 病人與他們的家人在我完成工作方面很幫得上忙。	1☐	2☐	3☐	4☐
ii. 我的工作要求我走路走得很快。	1☐	2☐	3☐	4☐
jj. 我的工作要求大量體力勞動。	1☐	2☐	3☐	4☐
kk. 我常在工作時被要求移動或抬起很重的物件。	1☐	2☐	3☐	4☐
ll. 我的工作要求非常迅速和持續的身體活動。	1☐	2☐	3☐	4☐
mm. 我常要在身體維持彎扭的姿勢下長時間工作。	1☐	2☐	3☐	4☐
nn. 我常要在頭部或手臂維持彎扭的姿勢下長時間工作。	1☐	2☐	3☐	4☐
oo. 我可在休息時間與同事談話。	1☐	2☐	3☐	4☐
pp. 我可離開工作崗位而與同事談話。	1☐	2☐	3☐	4☐
qq. 作爲工作的一部份，我可與同事互相商量。	1☐	2☐	3☐	4☐
rr. 在工作場所之外，我可與同事有社交活動。	1☐	2☐	3☐	4☐
ss. 在過去六個月內，我與同事在工作場所之外有過社交活動。	1☐	2☐	3☐	4☐

您在家的工作

	非常不同意 (1)	不同意 (2)	同意 (3)	非常同意 (4)	不適用 (5)
tt. 我在回家後需要做家務。	1☐	2☐	3☐	4☐	5☐
uu. 我需要照顧子女。	1☐	2☐	3☐	4☐	5☐
vv. 我需要照顧年邁的父母或親戚。	1☐	2☐	3☐	4☐	5☐
ww. 我的家務是非常忙亂的。	1☐	2☐	3☐	4☐	5☐
xx. 我的配偶在我完成家務方面很幫得上忙。	1☐	2☐	3☐	4☐	5☐

第五部份　您的個人資料

(請依據以下問題填入答案，或在適當的方格內打上「√」號)

31. 您的性別是男性還是女性？ ₀□ 男性 ₁□ 女性

32. 您幾多歲？ ______ 歲

33. 您的婚姻狀況是怎樣的？
    1□ 單身
    2□ 已婚
    3□ 離婚/分居
    4□ 鰥寡
    5□ 其他 (*請註明*：________________)

34. 您的身高是多少？ __________ 厘米 或 ____ 呎 ____ 吋

35. 您的體重是多少？ __________ 公斤 或 _________ 磅

36. 您從事護士護理工作有多少年？ ___________ 年

37. 您從事社康護理工作有多少年？ ___________ 年

38. 您提供何種服務？
    1□ 社康護理服務
    2□ 精神科社康服務
    3□ 其他 (*請註明*：____)

39. 您現時當上哪個護士護理職位？
    1□ 經理
    2□ 護士長
    3□ 專科護士
    4□ 註冊護士
    5□ 登記護士
    6□ 其他 (*請註明*：____________________________)

40. 您的專業教育程度是怎樣的？
    1□ 登記護士
    2□ 護理文憑
    3□ 護理學系理學士學位
    4□ 其他 (*請註明*：____)

41. 您有多少名與您同住而又需要您照顧的小孩？ ______ 名小孩

42. 您有多少名與您同住而又需要您護老或傷殘照顧的成人？ ________ 名成人

43. 在您家中，誰幫助您做家務？ (***在適用的方格內打上「√」號，可選多項***)

1□ 傭人　　2□ 您本人　　3□ 配偶　　4□ 其他 (請註明：________________)

44. 未扣稅前，您的個人每月的收入有多少？　　每月 $____________

45. 未扣稅前，您的家庭每月收入有多少？　　每月 $____________

請回答下列三條關於嚴重急性呼吸綜合症 (非典型肺炎)問題:

46. 因爲您的工作而感染到非典型肺炎 的危險性有幾高?

0□沒有危險　　1□低度危險性　　2□中度危險性　　3□高度危險性

47. 在您的中心採用了甚麼有效的預防措施來減少您感染到非典型肺炎的危險?

48. 您認爲您的中心還需要做些甚麼預防措施來減少您感染到非典型肺炎的危險?

****

若有其他意見，非常歡迎您在此抒見：

____

____

____

____

感謝撥冗完成此問卷調查

[illegible]

為了建立有效的計劃以減輕與工作有關的背部問題，必須有更多的研究。若您對未來的研究有興趣，並希望與吾等保持聯絡，請提供以下的資料。您的個人資料會絕對保密。吾等衷心感謝您參與此等研究，亦感激您對研究的貢獻。

姓名：________________________

聯絡電話號碼：__________________

電郵地址：____________________

若您願意參與將來的研究，
請填妥此頁，並把**此頁撕下**，
然後放在附帶的信封裡。
請把此頁與問卷**分開**交還。

Appendix F

A summary table about reliable and valid results on measuring physical risk factors

Questionnaires	Reliability	Validity
The MUSIC-1989	2-week test-retest reliability: (1) sitting (a) 6-point duration scale: $\underline{k}$=0.56 & $\underline{r}_i$=0.90 (b) dichotomized scale: $\underline{k}$=0.74 (2) walking (a) 6-point duration scale: $\underline{r}_i$ =0.78 (b) 5-point walking distance scale: $\underline{r}_i$=0.80 (3) trunk bent forward 20-60 (a) 6-point duration scale: $\underline{r}_i$ =0.52 (4) trunk bent forward > 60 (a) 6-point duration scale: $\underline{r}_i$ =0.59 (b) 6-point duration scale: $\underline{k}$=44 (c) dichotomized scale: $\underline{k}$=0.68 (5) trunk rotation > 45 (a) 6-point duration scale: r_i =0.53 (b) dichotomized scale: $\underline{k}$=0.51 (6) Head forward (a) 6-point duration scale: $\underline{r}_i$ =0.63 (7) Head backward (a) 6-point duration scale: $\underline{r}_i$ =0.53 (b) 6-point duration scale: $\underline{k}$=47 (c) dichotomized scale: $\underline{k}$=0.62 (8) Head rotation (a) 6-point duration scale: $\underline{r}_i$ =0.55 (b) dichotomized scale: $\underline{k}$=0.49 (9) Hands above shoulder (a) 6-point duration scale: $\underline{r}_i$ =0.54 (b) 6-point duration scale: $\underline{k}$=44 (c) dichotomized scale: $\underline{k}$=0.66 (10) kneeling or squatting (a) 6-point duration scale: $\underline{r}_i$=0.59 (b) 6-point duration scale: $\underline{k}$=45 (c) dichotomized scale: $\underline{k}$=0.66 (11) carrying/pushing/pulling (a) 1-5kg: 6-point duration scale: $\underline{r}_i$=0.54 & dichotomized scale: $\underline{k}$=0.65 (b) 6-15kg: 6-point duration scale: $\underline{r}_i$=0.57 (d) 16-45kg: 6-point duration scale: $\underline{r}_i$=0.59 & 6-point duration scale: $\underline{k}$=49 & dichotomized scale: $\underline{k}$=0.64 (e) > 45kg: 6-point duration scale: $\underline{r}_i$=0.71 (12) carrying/pushing/pulling (a) 1-5kg: 6-point duration scale: $\underline{r}_i$=0.62 & dichotomized scale: $\underline{k}$=0.64 (b) 6-15kg: 6-point duration scale: $\underline{r}_i$=0.66 (c) 16-45kg: 6-point duration scale: $\underline{r}_i$=0.63 & 6-point duration scale: $\underline{k}$=44 & dichotomized scale: $\underline{k}$=0.60 (d) > 45kg: : 6-point duration scale: $\underline{r}_i$=0.53 [Source: (Wiktorin et al., 1996)]	(1) sitting: (a) 6-point duration scale: $\underline{r}_s$ =0.85 (b) 3-point 0-100% duration scale: $\underline{k}$=0.52 (c) 2-point 0-100 duration scale: $\underline{k}$=0.77 (2) walking (a) 5-point distance scale: $\underline{r}_s$ =0.59 (b) dichotomized scale: $\underline{k}$=0.41 (3) Trunk bent forward > 60^0 (a) dichotomized scale: $\underline{k}$=0.43 (4) Head bent forward (a) dichotomized scale: $\underline{k}$=0.41 (5) kneeling or squatting (a) dichotomized scale: $\underline{k}$=0.76 (6) carrying/pushing/pulling (a) 6-15kg - dichotomized scale: $\underline{k}$=0.50 (b) 16-45kg - dichotomized scale: $\underline{k}$=0.64 (7) lifting (a) 1-5kg – 4-point duration scale: $\underline{r}_s$=0.63 (b) 6-15kg - dichotomized scale: $\underline{k}$=0.66 (c) 16-45kg - dichotomized scale: $\underline{k}$=0.65 [Source: (Wiktorin et al., 1993)]

A summary table about reliable and valid results on measuring physical risk factors

Questionnaires	Reliability
The MUSIC-1993	2-week test-retest reliability (1) sitting: (a) Proportion of day spent sitting (% of time): r_s =0.64 (2) bent or twist body posture several times per hour (5-point frequency scale): r_s =0.74 (3) hands above shoulders (5-point frequency scale): r_s =0,75 (4) hands below knee (5-point frequency scale): r_s =0.61 (5) repetitive hand or finger movements several times per minute exceeding 2 hours per day (5-point frequency scale): r_s=0.64 (6) lifting/carrying (a) 5-15kg (5-point frequency scale): r_s =0.89 (b) > 15kg (5-point frequency scale): r_s =0.83 [Source: (Torgen et al., 1997)]

Questionnaires	Validity
The MUSKELI	Self reports versus PEO and pedometer measurements (1) sitting (3-point duration scale): r_s =0.86 (2) walking (3-point distance scale): r_s =0.65 (3) neck rotation (3-point duration scale): r_s =0.55 (4) hands above shoulder (4-point duration scale): r_s =0.55 [Source: (Viikari-Juntura et al., 1996)]

A summary table about reliable and valid results on measuring physical risk factors

Questionnaires	Reliability
The RFQ	4 test-retest procedures were performed among 24 patients, 20 supervisors I, 33 supervisors II, and 29 workers: Overall the degree of agreement of the responses among items was in an acceptable range ($\underline{k} > 0.40$) without including the results from the supervisors I (detailed explanation given in the paper). [Source: (Halpern et al., 2001)]

Questionnaires	Validity
The TRRFQ	Self reports versus worksite observation performed by an occupational physician and a nurse practitioner (1) "does some of your usual work involve muscular effort" (3-point scale: no or little/some/a lot): $\underline{r}$=0.71 (2) lifting: (a) amount of time using 3-point scale: no or little/some/a lot: $\underline{r}_s$=0.73 (b) amount of effort using 3-point scale: no or little/some/a lot: $\underline{r}_s$=0.71 (3) lowering (a) amount of time using 3-point scale: no or little/some/a lot: $\underline{r}_s$=0.60 (b) amount of effort using 3-point scale: no or little/some/a lot: $\underline{r}_s$=0.61 (4) pushing (a) amount of time using 3-point scale: no or little/some/a lot: $\underline{r}_s$=0.67 (b) amount of effort using 3-point scale: no or little/some/a lot: $\underline{r}_s$=0.75 (5) pulling (a) amount of time using 3-point scale: no or little/some/a lot: $\underline{r}_s$=0.63 (b) amount of effort using 3-point scale: no or little/some/a lot: $\underline{r}_s$=0.75 (6) carrying (a) amount of time using 3-point scale: no or little/some/a lot: $\underline{r}_s$=0.63 (b) amount of effort using 3-point scale: no or little/some/a lot: $\underline{r}_s$=0.75 [Source: (Rossignol & Baetz, 1987)]

Appendix G

Ethical Approval from Various Institutions

COMMITTEE ON HUMAN RESEARCH
OFFICE OF RESEARCH ADMINISTRATION, Box 0962
UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
www.ucsf.edu/ora/chr

CHR APPROVAL LETTER

TO: Marion Gillen, PhD, MPH, RN
Box 0608

Kin Cheung, M.N.
Box 0608,

RE: Prevalence of and risk Factors for Work-Related Back Problems Among Community Nursing Personnel in Hong Kong

The Committee on Human Research (CHR) has reviewed and approved this application to involve humans as research subjects. This included a review of all documents attached to the original copy of this letter.

Specifically, the review included but was not limited to the following documents:
Information Sheet, dated 8/20/02

The CHR is the Institutional Review Board (IRB) for UCSF and its affiliates. UCSF holds Office of Human Research Protections Federalwide Assurance number FWA00000068. See the CHR website for a list of other applicable FWA's.

APPROVAL NUMBER: H8668-21747-01. This number is a UCSF CHR number and should be used on all correspondence, consent forms and patient charts as appropriate.

APPROVAL DATE: October 24, 2002. **Expedited Review**

EXPIRATION DATE: October 24, 2003. If the project is to continue, it must be renewed by the expiration date.

GENERAL CONDITIONS OF APPROVAL: Please refer to www.ucsf.edu/ora/chr/gen_cond_appvl.htm for a description of the general conditions of CHR approval. In particular, please note that prior CHR approval is required before implementing any changes in the consent documents or any changes in the protocol unless those changes are required urgently for the safety of the subjects.

QUESTIONS: Please contact the office of the Committee on Human Research at (415) 476-1814 or campus mail stop, Box 0962, or by electronic mail at chr@research.ucsf.edu.

Sincerely,

Susan H. Sniderman, M.D.
Chair
Committee on Human Research

COMMITTEE ON HUMAN RESEARCH
OFFICE OF RESEARCH, Box 0962
UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
www.research.ucsf.edu/chr/index.htm
chr@research.ucsf.edu
(415) 476-1814

ORA CHR APPROVAL LETTER

TO: Marion Gillen, PhD, MPH, RN
Box 0608

Kin Cheung, M.N.
Box 0608,

RE: Prevalence of and risk Factors for Work-Related Back Problems Among Community Nursing Personnel in Hong Kong

The Committee on Human Research (CHR) has reviewed and approved this application to involve humans as research subjects. This included a review of all documents attached to the original copy of this letter.

The CHR is the Institutional Review Board (IRB) for UCSF and its affiliates. UCSF holds Office of Human Research Protections Federalwide Assurance number FWA00000068. See the CHR website for a list of other applicable FWA's.

APPROVAL NUMBER: H8668-21747-02. This number is a UCSF CHR number and should be used on all correspondence, consent forms and patient charts as appropriate.

APPROVAL DATE: October 9, 2003 **EXPIRATION DATE:** October 9, 2004 **Expedited Review**

GENERAL CONDITIONS OF APPROVAL: Please refer to www.ucsf.edu/ora/chr/gen_cond_appvl.htm for a description of the general conditions of CHR approval. In particular, the study must be renewed by the expiration date if work is to continue. Also, prior CHR approval is required before implementing any changes in the consent documents or any changes in the protocol unless those changes are required urgently for the safety of the subjects.

HIPAA "Privacy Rule" (45CFR164): This study does not involve access to, or creation or disclosure of Protected Health Information (PHI).

Sincerely,

John D. Stansell

John D. Stansell, M.D.
Vice Chair, Committee on Human Research

cc:

HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

To whom it may concern

25 September 2002

This is to certify that approval has been given by the University in respect of the application for human subjects ethics review of the following project:

Project Title : Prevalence of and risk factors for work-related back problems among community nursing personnel in Hong Kong

Principal Investigator /
Chief Supervisor : Ms. Kin Cheung

Co-investigator : -
(including students)

Should there be any subsequent changes in the proposal or procedures, which may affect the validity of the ethical approval, the Principal Investigator / Supervisor shall be responsible for obtaining fresh approval.

B. Chung

Betty Chung (Miss.)
For & on behalf of
Departmental Research Committee
School of Nursing

25 years of dedication to advancing health care

醫院管理局
HOSPITAL
AUTHORITY

Quality Patient Centred Care Through Teamwork

Our Ref: (86) in HA/N/19/1(III)

Department of Nursing Health Sciences
The HK Polytechnic University
Hung Hom
Kowloon
(Attn: Ms. Kin CHEUNG)

11 June 2002

Dear Ms Cheung,

Requesting Permission for Collecting Research Data
Among Community Nursing Personnel

Your letter dated 15 March 2002 concerning the captioned matter refers.

After studying your research proposal/questionnaires and subsequent discussion with the Community Nursing colleagues, we have no objection for you to collect the research data from our community nurses on their volunteer basis.

I should be most appreciated if you could let us have a copy of your research finding upon the completion of your project. Please contact Ms. Irene HO at 2300 6910 for subsequent arrangement.

Warmest regards.

(Irene HO)
for SEM(N)

CNS Operational Group Members List	Tel. No.	Fax No.
Ms Anna Poon, CMC	3408 7173	2745 8301
Mr Kwan Siu Yuk, KH	2195 4113	2711 7764
Ms Yuen Suk Hang, KWH	2781 5217	2781 5197
Ms Au Wai Lin, NDH &FH	2683 7884	2652 5000
Ms Kwok Lan Fong, OLM	2354 2229	2354 9867
Ms Judy Leung, PMH	2990 1591	2990 1592
Ms Tsui Wai Ling, PYNEH	2595 6302	2515 2686
Ms Esther HO, QMH	2855 3771	2855 4005
Ms Rosa Lung, SH	2636 7620	2635 1037
Ms Alice Kwan, SJH	2981 1696	2981 9050
Ms Ho Suk Ming, TKOH	2208 0850	2706 0514
Ms Ho Kim Lai, TMH	7116 3228 a/c 759	2453 2317
Ms Yeung Kam Chu, UCH	2379 4797	2349 6616

Room 517N, 5/F Hospital Authority Building, 147B Argyle Street, Kowloon, Hong Kong Tel (852) 2300 6878 Fax (852) 2890 2043

明愛醫院
CARITAS MEDICAL CENTRE
九龍深水埗永康街111號
111 WING HONG STREET, SHAMSHUIPO, KOWLOON, HONG KONG
TEL: 2746 7911 FAX: 2785 5755

Kin CHEUNG
Lecturer
Department of Nursing & Health Sciences
The Hong Kong Polytechnic University
Hung Hom Kowloon
Hong Kong.

22 May 2003

Dear Ms. CHEUNG,

Re: Research on "Prevalence of and risk factors for work-related back problems among community nursing personnel in Hong Kong"

Thank you for your application letter dated 12 May 2003. Our Nursing Research Approval Committee has approved the conduction of the above study in CMC, on condition that you return the signed "Agreement to Obligations" form to our CND to demonstrate your acceptance of the obligations.

We look forward to seeing the outcome of your study.

Yours sincerely,

Andrew YEUNG
GM (N)

c.c. HCE

醫院管理局
HOSPITAL
AUTHORITY

群策群力為病人・優質護理滿社群
Quality Patient-Centred Care Through Teamwork

Kowloon Hospital
147A Argyle Street, Kowloon

19 May 2003

Ms. Kin CHEUNG
School of Nursing,
The Hong Kong Polytechnic University,
Hung Hom, Kowloon.

Dear Ms. CHEUNG,

Requesting Permission for Collecting Research Data
Among Community Nursing Personnel in CNS and CPNS Centers

Thank you for your letter dated 6 May 2003 applying for approval in conducting the above research in the Community Nursing Service (CNS) and Community Psychiatric Nursing Service (CPNS).

I am pleased to inform you that approval has been given for you to conduct the above research in both CNS and CPNS of Kowloon Hospital. You may wish to contact the following officers for logistic arrangement:

Ms. Nelly HO, Nursing Officer (CNS) at 3129 6976
Mr. YEUNG Cheuk-man, Ward Manager (CPNS) at 3129 6430

Look forward to sharing the result of your study.

Regards,

(KWAN Siu-yuk)
for Hospital Chief Executive
Kowloon Hospital

Cc COS(Psy), KH
GM (N), KH
DOM(Psy), KH
Mr. YEUNG Cheuk-man, WM(Psy), KH w/e
Ms. Nelly HO, NO, KHCNS w/e
Ms. Carmen YEUNG, HA (SS), KH

醫院管理局
HOSPITAL
AUTHORITY

Quality Patient-Centred Care Through Teamwork

27 May 2003

Mr. CHEUNG, Kin
Lecturer
Department of Nursing & Health Sciences
The Hong Kong Polytechnic University
Hung Hom, Kowloon

Dear Mr CHEUNG,

<u>Re: Data Collection on Study "Prevalence of and Risk Factors for Work-related Back Problems among Community Nursing Personnel in Hong Kong</u>

I am please to inform you that the Ethics Committee (Nursing) has scrutinized and approved your request. Below are some obligations that the Committee would like you to observe on completion of your report:

1. To create less disturbance to centers, please arrange the interview **after 3:30 pm**;
2. You are required to submit full copy of your academic report to the Ethics Committee (Nursing);
3. For promotion of nursing professional knowledge and skills in Kwai Chung Hospital, the Ethics Committee would like to ask for your consent to place your report in Central Nursing Division and Library of KCH for staff's reference. Please return the attached consent form to CND or by fax: 23710571;
4. Your have to seek prior approval from HCE, Kwai Chung Hospital for publication of the report.

If any query, please contact Ms Rose Mary LAU at 2959 8360.

Yours sincerely,

(Jennifer S.H. CHAN)
for Hospital Chief Executive
Kwai Chung Hospital

JC/rml

CNS/NKAI 60

Kwai Chung Hospital, 3-15 Kwai Chung Hospital Road, N.T., Hong Kong Tel: 2959 8255 Fax: 2371 0571

North District Hospital
9, Po Kin Road, Sheung Shui, New Territories
[Tel (852) 2683 8888 Fax (852) 2683 8383]

12 June 2003

Department of Nursing and Health Sciences
The HK Polytechnic University
Hung Hom
Kowloon
(Attn.: Mr. Kin CHEUNG)

Dear Mr. Cheung

Request Permission for Collecting Research Data on CNS and CPNS Personnel

Thank you for your e-mail dated 12 May 2003.

I am pleased to inform you that we have no objection for you to collect the research data from our nurses serving at the CNS and CPNS.

Most appreciated if you could send your research findings to us upon completion of the project.

Yours sincerely,

Bonnie WU
For General Manager (Nursing)
North District Hospital

c c Dr. Raymond Chen Chung I, AHNH HCE
Professor Helen Chiu, NTEC CC(PSY)/NDH COS(PSY)
Ms. Maria Chui Yeuk Ping, TPH DOM
Mr. Philip Li, SH DOM (Psy)
Ms. Rosa Lung, SH WM (COST)
Ms. Cheung Sau Lan, AHNH NO (COST)
Ms Chim Chun King, NDH NO (COST)

東區尤德夫人那打素醫院

PAMELA YOUDE NETHERSOLE EASTERN HOSPITAL

CENTRAL NURSING DIVISION

22 July 2003

Ms Kin CHEUNG
Lecturer
School of Nursing
Department of Nursing & Health Science
The Hong Kong Polytechnic University
Hung Hom
Kowloon
Email: hskin@inet.polyu.edu.hk

Our Ref: (7) in CND/NR/03

Dear Ms Cheung,

Application for Approval of Research Protocol
"Prevalence of and Risk Factors for Work-related Back Problems Among Community Nursing Personnel in Hong Kong"

I refer to your application and research protocol submitted sent to us on 8 July 2003 to conduct the captioned study in CNS and CPNS of our hospital. I write to inform you that approval has been given to you to conduct the study according to your protocol submitted.

Please note that **any modification or adverse incident** during the study should immediately be reported to the Ethics Committee in writing.

You are requested to notify the Ethics Committee upon completion of the study. The study result should be sent COS(PSY) and me for information and comment before external release.

For logistics arrangement, you are welcome to contact Ms Gloria ABOO, NO(CND) at 2595 6366 or via email aboogh@ha.org.hk

Wishing you every success in your study.

SF Cheung

Ms CHEUNG Sau-fong
General Manager (Nursing)
Pamela Youde Nethersole Eastern Hospital

c.c. Chairperson, Ethic Committee (Attn. Ms Gina WAI)
DOM(PSY/F)
WM(CNS)

GA/FC/CSF/ga

PRINCESS MARGARET HOSPITAL
瑪　嘉　烈　醫　院

PMH/NRS/03/02
26th May, 2003

Ms Kin Cheung,
Lecturer,
School of Nursing,
The Hong Kong Polytechnic University,
Hung Hom , Kowloon,
Hong Kong

Dear Ms CHEUNG

Requesting Permission for Collecting Research Data Among Community Nursing Personnel
Re: Prevalence of and Risk Factors for Work-related Back Problems among Community Nursing Personnel in Hong Kong.

Your letter dated 6th May 2003 refers.

I am glad to inform you that approval has been granted for you to conduct the captioned study in Princess Margaret Hospital in June 2003

However, please be informed that all subjects participated must be on voluntary basis and that the service will not be affected. Please kindly contact Ms. Judy LEUNG, Department Operation Manager of Community Nursing Service at 2990 1591 for the sampling and distribution of questionnaires.

I should be most appreciated if you could let us have a copy of your research finding upon the completion of your project.

Yours sincerely,

Ms. Adela LAI,
General Manager (Nursing)
Princess Margaret Hospital,
c.c. DOM i c ACC&CNS

醫院管理局
HOSPITAL AUTHORITY

群策群力為病人・優質醫護滿杏林
Quality Patient-Centred Care Through Teamwork

St. John Hospital
Tung Wan Road
Cheung Chau

Ms. Kin Cheung
Lecturer
Dept of Nursing & Health Sciences
The Hong Kong Polytechnic University

31 May 2002

Dear Ms. Cheung,

Re: Requesting Permission for Collecting Research Data among Community Nursing Personnel in Your CNS Center

I refer to your letter dated 6 May 2003 related to the above and wish to advise you that we are happy to assist you in your research. Please contact Ms. Alice Kwan, our Department Operation Manager, for the needful.

Best Regards,

Dr. D. Wijedoru
Hospital Chief Executive
St. John Hospital

將軍澳醫院
Tseung Kwan O Hospital

Memorandum

Our Reference: TKO-N-2003-014

June 11, 2003

To: Mr. Kin CHEUNG,
Lecturer
Department of Nursing & Health Sciences
The Hong Kong Polytechnic University

Dear Mr. Cheung

RE: Requesting Permission for Collecting Research Data among Community Nursing Personnel in Your CNS Centre

Referring to your letter on 12 May 2003, I am pleased to inform you that you could start data collection from nurses of the CNS Centre in TKOH. You may contact Ms HO Suk Ming, Nursing Officer at 2208 0850 for assistance.

Warmest Regards!

(KEUNG Sau-ho)
GM(Nursing), TKOH

The Nursing Administration Office, 6/F Tseung Kwan O Hospital, Hang Hau, Tseung Kwan O
Tel: 22081173 Fax: 2174 8974

基督教聯合醫院
UNITED CHRISTIAN HOSPITAL
Tel 2379 4704
Fax 2727 1990

Our ref: (17)in ND/res/5/03

17 May 2003

Mr. Kin Cheung
Lecturer
School of Nursing
Department of Nursing and Health Sciences
The HK Polytechnic University
Hung Hom
Kln.

Dear Mr. Cheung,

Application for Research in UCH

In reply to your letter dated 14 May 2003, I am pleased to inform you that the application of carrying out a research study on "Requesting permission for Collecting Research Data among Community Nursing Personnel in CNS and CPNS Centers", we have no objection for you to collect the research data from our community nurses on their volunteer basis.

Please be reminded that you should observe the following:

(1) The research work must not be a disturbance to the normal operation of the hospital.

(2) The collection of questionnaire are responsibilities of researchers.

(3) Research should first obtain permission from the target respondents of your research before data collection.

(4) Results of the research, including the name of the hospital, should be kept in the strictest confidence.

For detail arrangement, please contract Ms. K C Yeung, DOM (CNS) at 2379 4797 and Ms. Y H Tai, DOM (Psy) at 2379 4443.

May I take this opportunity to wish you every success in your research.

Yours sincerely,

Ms. Chan Yuet Kwai
General Manager (Nursing)

CYK/LSY
c.c. Ms. K C Yeung, DOM (CNS)
Ms. Y H Tai, DOM (Psy)

Appendix H

Substruction of the study