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Psychometric determination of job stress in health occupations

Daniel L. Gilbert
University of Tennessee

To the Graduate Council:

I am submitting herewith a dissertation written by Daniel L. Gilbert entitled "Psychometric determination of job stress in health occupations." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Human Ecology.

Ernest W. Brewer, Major Professor

We have read this dissertation and recommend its acceptance:

Gregory Petty, Connie Hollingsworth, Michael Lane Morris

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Dean of Graduate Studies

PSYCHOMETRIC DETERMINATION OF JOB STRESS IN HEALTH OCCUPATIONS

A Dissertation
Presented for the
Doctor Of Philosophy
Degree
The University of Tennessee, Knoxville

Daniel L. Gilbert
December, 2002

DEDICATION

This dissertation is dedicated to the nurses, pharmacists, and radiologic technologists who participated in the study. These represented countless healthcare workers around the world who perform their tasks with dedication and commitment, often without any word of thanks. I am proud to have worked in healthcare for more than 20 years, and was deeply moved by the contributions of these professionals to this work.

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ABSTRACT

The primary purpose of this study was to develop an instrument to measure stress in health occupations. The effects of job stress on productivity, health insurance utilization, workers' compensation claims, and turnover cost organizations billions of dollars annually. Given that health occupations are subject to high levels of stress and that the workforce is experiencing labor shortages, healthcare organizations are especially interested in human resource development programs that deal with identifying, acknowledging, and managing occupational stress.

Development of the instrument was accomplished by an extensive review of related literature, feedback from subject matter experts using the Delphi technique, pilot testing of a proposed instrument, and field-testing the instrument on a national sample. A 14-member Delphi panel examined a list of 117 stressors from a review of literature. The panel reached a consensus on 38 items that formed the pilot version of the scale.

The pilot scale was administered to 181 RNs, 10 pharmacists, and 25 radiologic technologists working at a hospital in Chattanooga, Tennessee. Based on a factor analysis, the scale was administered to 2,000 RNs, 500 pharmacists, and 500 radiologic technologists employed by subsidiary hospitals of HCA, Inc., an international healthcare organization. The subsequent factor analysis resulted in the Health Occupations Stress Scale consisting of 18 items and 4 subscales.

Major findings of the study were (a) the Health Occupations Stress Scale consisted of the Job Demands, Interpersonal Conflicts, Work-Home Balance, and Regulatory Complexity subscales; (b) regulatory complexity has emerged as a significant factor in occupational stress in healthcare; and (c) RNs reported higher occupational

stress scores than pharmacists and radiologic technologists, especially for the Job Demands subscale.

Descriptive statistics, including frequencies and percentages, were used to report demographic information, as well as perceptions of turnover cognition. Principal components analysis using a varimax rotation procedure with the Kaiser criterion was performed on both the pilot and national data. A chi-square test for independence was performed on selected demographic variables of nonrespondents. Reliability coefficients for internal consistency also were reported for both the pilot and national data.

TABLE OF CONTENTS

CHAPTER PAGE

CHAPTER PAGE

CHAPTER PAGE

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Research indicates that the effect of occupational stress is detrimental to a number of worker dimensions including job satisfaction, performance, productivity, attendance, and safety. Officials with the National Institute for Occupational Safety and Health (NIOSH, 1999) defined occupational stress as the occurrence of harmful physical and emotional responses arising from a mismatch between job requirements and the capabilities, resources, or needs of the individual. The federal agency, responsible for research and policy development on job-related illnesses and injuries, cited findings where 40% of employees reported their jobs as being very stressful. Expenditures on medical claims incurred for such individuals were 50% higher.

The detrimental effects of stress have also been reported in trade publications to American business leaders (Smith, 1999; Wojcik, 1999). In her article in *Business Insurance*, Wojcik stated that 60 to 80% of on-the-job injuries have stress-related causes. She found increases in turnover as high as 40% where stress was reported. According to the American Institute of Stress (AIS, 2002), occupational stress costs businesses approximately $300 billion annually, in terms of lower productivity, increased turnover, higher health insurance expenses, and increased workers' compensation claims. Smith confirmed these billion dollar figures, adding that stress-related workers' compensation claims have increased 10% over the past decade.

Interest in the impact of job stress on employee behavior and its effect on organizational outcomes has been reported in a variety of disciplines. Studies show that professionals in the healthcare industry, most particularly acute care hospitals, are

especially prone to a high incidence of occupational stress. As Rees (1995) stated:

> While there is a considerable body of literature regarding the existence of stress across all sectors of employment, there is a belief that health workers are particularly susceptible to developing health-related illnesses because of the nature of their work. (p. 4)

The United States and other countries are experiencing a nursing shortage ("State of the Nursing Shortage," 2000) along with the challenges of dealing with occupational stress. While enrollment at nursing schools in recent years has dropped by 20%, the need for registered nurses (RNs) has actually increased by this same rate. This disparity has alarmed professionals in the healthcare industry and as a result they are enticing students to enroll in nursing programs in return for higher pay, educational assistance, and other similar incentives. Some providers have offered up to $15,000 *sign-on* bonuses to RNs as employment incentives (Morrison, 2001).

The turnover of healthcare personnel exacerbates the problems organizations are having with shortage areas. Managers must constantly recruit qualified candidates in order to fill vacant positions to meet patient care demands. The shortage of qualified personnel and national turnover rates among nursing classifications is near 20% (Brownson & Harriman, 2000), and the healthcare industry is interested in examining those factors influencing a nurse's decision to leave employment.

Rationale for the Study

Karasek (1979) postulated that occupational stress results from unresolved mental strain on the job. Based on his national survey data from Sweden and the United States, Karasek hypothesized that two factors determine job strain: *job demands* and *decision latitude*. Examples of job demands include workload, pressure to perform, and conflict.

Decision latitude can be expressed as autonomy, discretion, and control on the job.

In the field of occupational stress, Karasek's (1979) model has been investigated repeatedly on those working in the health occupations (Cheng, Kawachi, Coakley, Schwartz, & Colditz, 2000; De Jonge, Mulder & Nijhuis, 1999; De Rijk, Le Blanc, Schaufeli, & De Jonge, 1998; Sparks & Cooper, 1999). The job strain theory is particularly useful in studying healthcare populations because healthcare professionals experience high demands and elevated workloads. Additionally, decision latitude and job autonomy are important concepts for human resources (HR) practitioners attempting to attract persons to healthcare professions.

A number of instruments to measure occupational stress are available to researchers. These include general stress scales such as the *Job Content Questionnaire* (Karasek, 1985), *Occupational Stress Indicator* (Cooper, Sloan, & Williams, 1988), and the Job Stress Survey (Vagg & Spielberger, 1998). During the 1980s healthcare-specific instruments were developed, including the Nursing Stress Scale (Gray-Toft & Anderson, 1981), Medical Personnel Stress Survey (Hammer, Jones, Lyons, Sixsmith, & Afficiando, 1985), Health Professions Stress Inventory (Wolfgang, 1988), and Nursing Stress Index (Harris, 1989).

Since the time these healthcare-specific instruments were developed, a number of dramatic changes have occurred in the industry (Dworkin, 2002; Metzger, 1999; Schumacher, 2002; Snook, 1999). These changes include the following:

1. Advances in technology, such as magnetic resonance imaging (MRI) and robotic surgery (Schumacher, 2002).
2. Increases in acquisitions, mergers and divestiture or closings of hospitals (Mesch, McGrew, Pescosolido, & Haugh, 1999; Metzger, 1999).

3. Growth in the popularity of managed care organizations (Metzger, 1999; Schumacher, 2002; Snook, 1999).

4. Declines in the average length of stay for hospital inpatients ("Hospital Stays Shorten," 2001).

5. Decreases in the number of hospitals, especially rural hospitals (Snook, 1999).

6. Increases in outpatient care with a corresponding decrease in inpatient care (Kongsvedt, 1999).

7. Increases in the amount of paperwork required to document care (Dworkin, 2002).

While these changes have had a direct impact on hospital-based professionals, all segments of the industry have felt the effect. Managed care organizations reimburse hospitals, physicians, and other healthcare providers based on a negotiated fee per covered enrollee (Kongstvedt, 1999). Such arrangements provide no incentive for the provider to keep the patient in the system longer than absolutely necessary or medically safe to do so. This has resulted in decreases in the average length of stay for hospital inpatients ("Hospital Stays Shorten," 2001). Volume decreases have led to an increase in acquisition and merger activity (Metzger, 1999). In many cases the result has meant the closing of hospitals, especially in rural areas. Patients who exceed the average tend to be in poorer health and require more medical interventions than those discharged within a few days. During the same period, the industry has experienced profound increases in the amount of documentation required to obtain payment for services. All of these issues have implications for a workforce susceptible to occupational stress.

Purpose of the Study

The primary purpose of this study was to develop an instrument to measure stress in health occupations. The industry-specific instruments from the 1980s pre-date the

advent of the managed care age and its impact on healthcare delivery. Despite the many changes that have occurred, researchers continue to rely on these for empirical studies. Others settle for general scales that were not designed to measure stress-related dimensions of healthcare jobs. A modern, updated instrument was needed to measure occupational stress in health occupations that reflects the job strain experienced by today's work force.

Statement of the Problem

Human Resource Development (HRD) professionals need an instrument with which to measure the occupational stress for various health occupations. No current scale measures the aspects of job stress being experienced by healthcare workers today. A review of related literature indicated that the majority of instruments used in stress research were developed in the 1980s and before.

This study resulted in the development of the Health Occupations Stress Scale (HOSS), a scale that measured the level of stress perceived by healthcare workers across three occupations. Through the assessment of antecedents to job stress, HRD professionals can develop workplace intervention programs to alleviate negative psychological outcomes. Leaders will be able to effectively manage job satisfaction, turnover, and factors associated with job stress.

Research Questions

Given that a scale of occupational stress for healthcare occupations was designed, tested, and validated, the following research questions were examined:

1. What are the common factors of occupational stress in healthcare employees?

2. Did exploratory factor analysis of items from the HOSS identify latent constructs consistent with theory?

3. Did exploratory factor analysis of an instrument measuring stress in healthcare occupations result in an interpretable factor structure of constructs?

4. Which occupational group experienced higher levels of stress on each factor?

Assumptions, Limitations, and Delimitations

Assumptions of the Study

Assumptions are conditions or factors presumed to be true by the researcher. A number of assumptions existed for the present study.

1. Respondents to Delphi, pilot, and the final questionnaire were working in a healthcare occupation at the time the questionnaire was completed.

2. Respondents in the pilot and final phases of the study were employed by subsidiaries of an investor-owned national healthcare corporation and did not feel compelled to participate due to the parent company's endorsement of the study.

3. Respondents in the pilot and final phases of the study did not mark the questionnaire items in a socially desirable manner due to the parent company's endorsement of the study.

4. Respondents completed the questionnaire honestly.

Limitations of the Study

Limitations are conditions that may affect the outcome of a study but are not under the control of the researcher. The limitations of this study were primarily related to the population from which the sample was drawn and study design.

1. I had no control over the respondents and they were not required to participate in the study.

2. Employees of investor-owned organizations may respond differently than those working in the government-owned, religious-affiliated or not-for-profit sectors of healthcare.

3. Employees of organizations associated with other facilities in numerous states may respond differently than those working for an organization limited to one location.

4. The survey sample was drawn from employees working in 23 states. Responses may be different for those working in other states.

5. Cross sectional, self-report data have been shown to contain a number of potential problems, such as response bias and lack of generalizability.

6. Mailed questionnaires have been shown to be subject to low response rates (Baruch, 1999; Cooper & Payne, 1988).

Delimitations of the Study

Delimitations are factors that may affect the outcome of a study and are under the control of the researcher. In this study the delimitations were associated with the population, instrumentation, and demographic variables.

1. The population identified in this study was delimited to registered nurses, pharmacists, and radiologic technologists working for subsidiaries of an investor-owned healthcare corporation operating in 23 states.

2. All occupational stress data analysis and conclusions were based on the perceptions of respondents as measured by the HOSS.

3. This study was delimited by the demographic variables of job title, age, race, gender, marital status, shift, employment status, education, tenure, department, supervisory status, social support, and number in household.

4. Using the HOSS, a factor analysis was performed on the perceptions of stress as reported by respondents.

Operational Definition of Terms for the Study

The HRD and healthcare fields each employ unique terminology. It was necessary to operationally define key terms for the purpose of this study in order to establish agreement on their meaning. The definitions presented will aid in objectively analyzing the results and assist other researchers in replicating the study.

1. *Add-on examination*: An unscheduled examination, diagnostic study, or medical treatment, either worked in to a department's schedule during a given shift or *added on* at the end of the shift.

2. *Allied health professional*: A licensed healthcare professional, exclusive of nursing, such as a pharmacist or radiologic technologist.

3. *Burnout*: The phenomenon in which a worker experiences emotional exhaustion, high depersonalization, and a sense of low personal accomplishment.

4. *Case Manager*: A healthcare professional responsible for overseeing the care plan of a patient; often a person with a baccalaureate degree in social work or nursing.

5. *Charge Nurse*: A nurse, most often an RN, responsible for a specific hospital nursing unit on a given shift.

6. *HCA*: A healthcare organization, with corporate offices in Nashville, Tennessee, operating 181 hospitals and 80 ambulatory surgery centers in 23 states, London, England, and Geneva, Switzerland, doing business officially as HCA, Inc. In the past the company has also used the name Hospital Corporation of America and HCA –The Healthcare Company.

7. *Healthcare occupations*: Vocations unique to the providers of medical, hospital, and other health-related services, such as RNs, pharmacists, or radiologic technologists.

8. *Health Occupations Stress Scale (HOSS)*: An instrument hypothesized to measure the perceptions of occupational stress of healthcare workers.

9. *Licensed Practical Nurse (LPN)*: A licensed healthcare professional responsible for administering a plan of care for a patient, often under the direction of an RN, in accordance with requirements established by state health entities. The minimal educational requirement for the LPN is 1 year of vocational and clinical training.

10. *Occupational stress*: Also know as *job stress* or *job strain*. The phenomenon in which the demands of a job exceed decision latitude.

11. *Registered Nurse (RN)*: A licensed healthcare professional responsible for administering a plan of care for a patient, in accordance with requirements established by state health entities. The minimum educational requirement for the RN is an associate's degree.

12. *Nurses*: A generic term used to describe RNs and LPNs collectively.

13. *Nursing Assistant (NA)*: An unlicensed caregiver, operating under the direction of an RN or LPN.

14. *Pharmacist*: An allied health professional that administers pharmaceuticals and prescription medications in accordance with requirements established by state health entities. The minimal educational requirement for the pharmacist is a 5-year baccalaureate degree; since 2000, a 6-year doctor of pharmacy degree is required.

15. *Radiologic Technologist*: An allied health professional that operates radiographic equipment in order to make images of bones, organs, and tissues, in accordance with requirements established by state health entities. The minimum educational requirement for the radiologic technologist is an associate's degree.

16. *Senior Nurse*: A term from Great Britain indicating an experienced nurse.

17. *Turnover*: The phenomenon of workers withdrawing from the organization through separation from employment.

18. *Turnover cognition*: Thoughts of quitting; the intentions of a worker to separate from employment.

Summary of Introduction

The researcher developed a scale to measure job stress across healthcare occupations. Given that turnover among nurses and allied health professionals is a major concern to employers, the instrument will be useful to HRD practitioners and healthcare administrators so that development programs can be designed to improve job satisfaction and working conditions. A review of related literature supported the need for the HOSS.

CHAPTER II

CONCEPTUAL AND THEORETICAL FRAMEWORK

Conceptual Framework

The Job Demand-Control (JD-C) Model of Karasek (1979) contributed to the conceptual framework for the present study of occupational stress in healthcare occupations. Using the factors of job demands and decision latitude, Karasek labeled his graph of the JD-C interactions as the *Job Strain Model* (p. 288), and his theory is often referred to as this in the literature. Figure 1 is a representation of his model.

The JD-C model arising from the combination of these factors permits the researcher to predict those working conditions resulting in the greatest job strain and least job strain. High demands and very little decision latitude or control characterizes jobs highest in strain. Low demands and high decision latitude differentiate jobs low in strain.

According to Karasek (1979), "incremental additions to competency are predicted to occur when the challenges of the situation are matched by the individual's skill or control in dealing with a challenge" (p. 288). This means that the stress associated with increasing demands is mitigated by corresponding increases in latitude and discretion in decision making. This explains why those working in executive-level positions may experience less occupational stress than entry-level personnel.

Karasek (1979) identified high demand, high decision latitude jobs as *active*, meaning that the worker was actively involved in his or her personal and professional development. A position in which the incumbent was encouraged to use tuition assistance to pursue additional academic education in his or her profession would be an example of an active job. Jobs in the upper-right quadrant of his model, the high demand, low

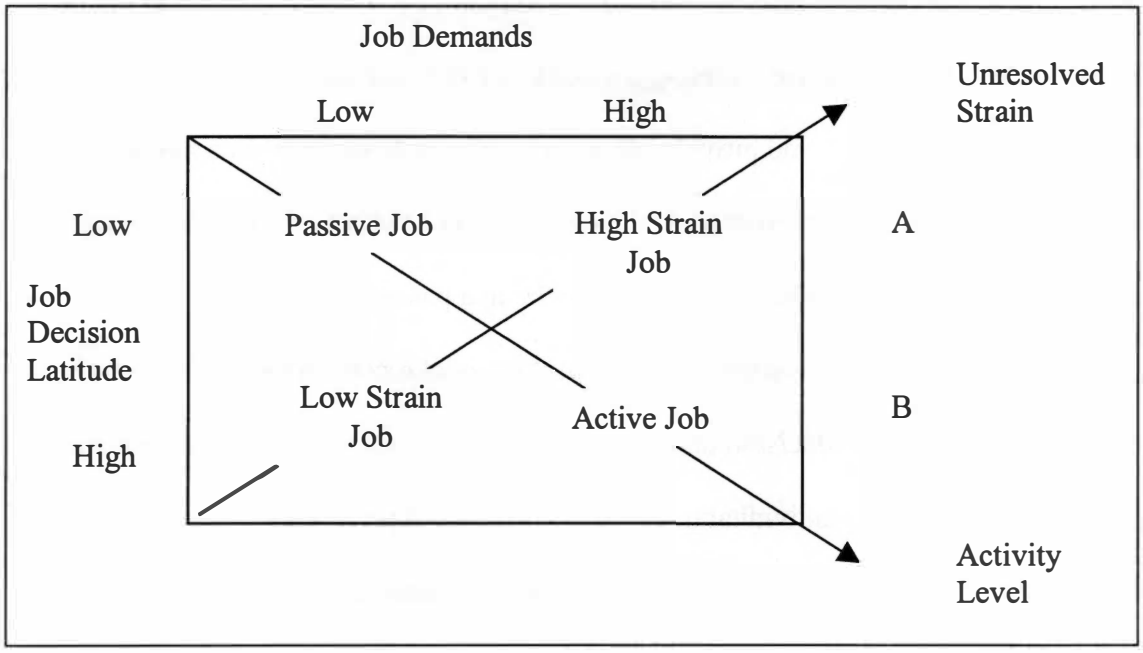

Figure 1. Karasek job demand-control model.

Note: From "Job demands, decision latitude and mental strain: implications for job redesign," by R. Karasek (1979). *Administrative Science Quarterly, 24*, p. 288. Copyright 1979 by Administrative Science Quarterly. Used by permission from the author.

latitude jobs, were termed *passive.* Individuals in passive jobs are presumed to not be involved in self-development. Nursing assistants are non-licensed, entry-level healthcare workers who bathe, feed, and provide other personal care to patients. In a number of locales, certification is not required. If the organization does not promote certification or additional skills training, the individual would be in a passive job.

The *A* and *B* labels on the right side of the model represent those situations in which job demands and decision latitude deviate (*A* jobs) and where they are matched (*B* jobs). Theoretically, an individual in an *A* job would be experiencing unresolved mental strain, defined by Karasek (1979) as "the excess of demands over decision latitude" (p. 288).

In 1985, Karasek published the Job Content Questionnaire (JCQ) in support of his job strain model. In its original form, the JCQ measured the risk of work-related coronary heart disease (CHD) due to unresolved strain. As a result of increased research interest in CHD risk factors, Karasek, his JD-C model, and the JCQ gained popularity in the 1980s (Karasek, Russell, & Theorell, 1982; Karasek et al., 1988). The scales of the 49-item JCQ consist of decision latitude, psychological demands, mental workload, social support, physical demands, and job insecurity (Karasek et al., 1998). Despite its inclusion of physiological health on the physical demands subscale, the instrument has had limited use in studies of healthcare populations but is cited as a reliable diagnostic measure of stress (Quick, Quick, Nelson, & Hurrell, 1997). The Job Stress Network is an informative Web site regarding Karasek, his research, and the JCQ (http://www.workhealth.org).

Karasek later teamed up with Theorell for a book about staying healthy on the job (Karasek & Theorell, 1990). They developed nine occupational groups (ranked one to

nine in terms of status) to illustrate the idea that certain job classifications were naturally disposed to specific areas on the job strain model. Nurses and health technicians were placed in the fourth occupational group, labeled *technicians/administrators*, with programmers and clerk supervisors (p. 280). *Health technicians* were not specifically identified, but presumably these would be similar to radiologic technologists since they were in the same category as nurses. Nursing assistants were placed in the sixth group, labeled *commercialized service workers*, together with sales clerks and waiters.

Based on their research, Karasek and Theorell (1990) superimposed these occupational groupings onto the job strain model. The technicians and administrators' group, which included the nurses, was placed above the intersect of the demand and decision latitude lines. This indicated moderate decision autonomy and moderate psychological demands. The commercialized service workers' group, which included the nursing assistants, were placed below and to the right of the intersect point, indicating low decision latitude and higher psychological demands. This seemed to contradict the findings of Gray-Toft and Anderson (1981), developers of the first healthcare-related stress scale, who found lower levels of stress and turnover among nursing assistants when compared to registered nurses.

Theoretical Framework

The proposed study concerns the development of a scale to measure stress across healthcare occupations. The theoretical framework will therefore be based on principles related to instrument design. The contributions of DeVellis (1991) and Spector (1992) are important in this regard.

In his work on scale development, DeVellis (1991) delineated some guidelines or

steps for researchers to consider which are discussed in detail in Chapter 4. These were as follows:

1. Determine what is to be measured.
2. Develop an initial pool of items.
3. Determine the measurement format.
4. Ask subject matter experts to review initial item pool.
5. Consider including validation items.
6. Conduct a pilot study.
7. Assess item performance.
8. Determine the optimum length of the instrument.

In his work on summated rating scales, Spector (1992) provided some steps. These are more succinct and less detailed than those of DeVellis (1991) but capture the essence of good instrument formation. The sequential process of scale development according to Spector is as follows:

1. Define the construct under consideration.
2. Design the draft instrument.
3. Pilot test the draft instrument.
4. Administer the instrument and assess item performance.
5. Establish validity and normative data for the scale.

Summary of Conceptual and Theoretical Framework

The JD-C model proposed by Karasek (1979) served as the conceptual framework for the present study. Registered nurses, pharmacists, and radiologic technologists are subject to high demands on the job, and their status as professionals contributes to

various levels of control over their work. Against this backdrop, the work of DeVellis (1991) in the field of scale development contributed to the theoretical framework. These provided a structure for the formation of the HOSS, an instrument recommended for the psychometric determination of stress in health occupations. Figure 2 represents a model of the study.

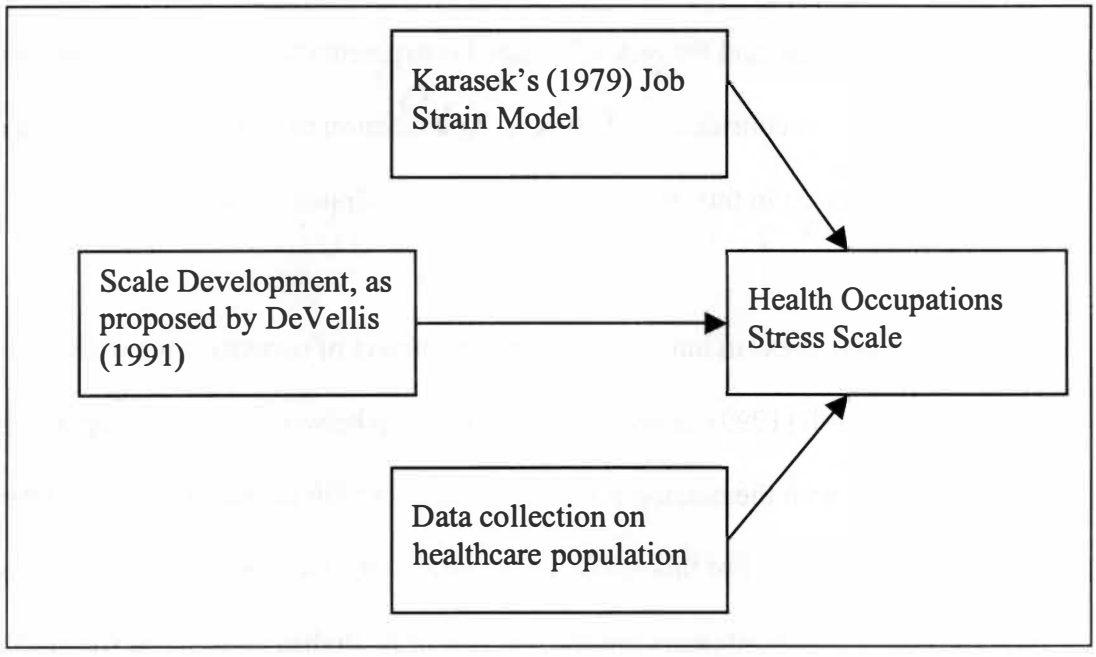

Figure 2. Conceptual and theoretical framework of the study.

CHAPTER III

REVIEW OF RELATED LITERATURE

A review of related literature indicated that a considerable amount of research has been conducted on occupational stress due to its detrimental effect on the workforce and that healthcare populations are susceptible to stressful occupational situations. In particular, Karasek's (1979) JD-C model was reviewed and its continued application to healthcare settings was discussed. Numerous changes in the delivery of healthcare have occurred since the 1980s, and the lack of updated instruments to measure occupational stress in healthcare was considered. The years of publication of primary stress scales used by researchers discussed in this chapter are presented in Appendix A.

Stress in Nurses

Occupational stress in nursing has been the subject of numerous research studies. Hemingway and Smith (1999) examined the relationship between certain occupational stressors associated with the nursing profession, together with the incidence of injuries and withdrawal behaviors. For this study, withdrawal behaviors were defined as turnover and absenteeism. The investigators proclaimed that prior studies considered workplace stressors that were too general in nature and advanced the idea that their research of occupation-specific stressors was more useful to healthcare decision-makers. Central to their discussion was the issue of organizational climate, the psychological environment in which workers perform.

Hemingway and Smith (1999) sampled 252 full time RNs from among four hospitals in Ontario, Canada. Respondents had a mean age of 42 and 98% were female. Seventy-one percent (71%) of the RNs were married. While periods of tenure ranged

from 1 to 38 years, 25% had worked in their present position for more than 20 years.

The work pressure, autonomy, supervisor support, and peer cohesion components of the Work Environment Survey (WES) were adopted to evaluate organizational climate. Reliability estimates for the WES were reported to be as high as 0.80. Hemingway and Smith (1999) cautioned that these measures ranged from 0.52 to 0.73. An *S-point* scale developed in 1970 was used to capture data on the job-related stressors of role conflict and role ambiguity. Reliability for the role conflict scale measured 0.50 while that of the role ambiguity instrument measured 0.78.

The death and dying of patients and workload subscales of the 34-item Nursing Stress Scale (NSS), developed by Gray-Toft and Anderson (1981), were applied and consisted of a reliability measure of 0.79. Hemingway and Smith (1999) used criteria from the Ontario Workers' Compensation Board to classify composite injury data by (a) contusions, (b) scratches, (c) strains and sprains, and (d) cuts and punctures (the four most common types), and further segmented these by reported injuries, unreported injuries, and near injuries. The rate of absenteeism was determined from self-reported data and was defined as absences of two days or less within the previous 6-month period. Results were positively skewed by *no absence* responses.

Turnover intentions were assessed by using three dimensions of the Michigan Organizational Assessment Questionnaire (Seashore, Lawler, Mirvis, & Cammann, 1982), a 7-point scale of termination likelihood with a reliability coefficient of 0.83. Multiple regression analysis was performed to determine the extent to which the variables were related. Three hypotheses were tested: (a) favorable dimensions of organizational climate predicted lower levels of occupational stress, withdrawal behaviors, and injuries;

(b) an increase in occupational stressors was associated with an increase in withdrawal behaviors and injuries; and (c) a direct climate-outcome relationship existed.

Hemingway and Smith (1999) found that the first and second hypotheses were supported but with mixed results. Of the four components studied utilizing the WES, low peer cohesion had the strongest relationship to the occupational stressor of death and dying patients (ß = -0.35). The WES subscale of work pressure had the greatest impact on workload (ß = 0.67) and role conflict stressors (ß = 0.64), while a lack of autonomy was predictive of greater role ambiguity (ß = -0.49). Turnover intentions were significantly related to the occupational stressor of role conflict.

Interestingly, absenteeism was not directly related to the stressors. However, data were skewed as a result of a large number of respondents self-reporting zero absences during the previous 6-month period. Increases in role ambiguity were related to reportable injuries, while death and dying patients were linked to unreported injuries and near injuries. The third hypothesis was not supported as none of the organizational climate dimensions contributed significantly to withdrawal behaviors or injuries.

Hillhouse and Adler (1997) investigated whether RNs could be differentiated by the stress effect subtypes of burnout, affective symptoms, and physical symptoms. Citing previous research where RNs experienced higher rates of mortality, psychiatric illnesses, and general stress-related problems than the general population, possible interventions for management were explored. Where prior studies delineated nursing subgroups by type of job assignment (for example, critical care nurses versus non-critical care), cluster analysis was used to analyze whether natural groupings existed beyond work settings.

Questionnaires were distributed by Hillhouse and Adler (1997) to 709 randomly

selected university hospital RNs, of which 260 were returned for a 36.7% response rate. The mean age of those responding was 34.0 years and 96.5% were women. The NSS (Gray-Toft & Anderson, 1981) was employed in this study to determine the rate and source of major stressors. Reliability measures for the NSS were reported at 0.89. Hillhouse and Adler utilized the Staff Burnout Scale for Health Professionals (SBS-HP) to gather information on burnout. The SBS-HP had a reported internal reliability coefficient of 0.93. Affective symptoms were measured using the Profile of Mood States with a test-retest reliability of 0.74. Data on physical symptoms were collected using the Psychosomatic Symptom Checklist, a 17-item instrument with a test-retest reliability of 0.80.

Three groupings emerged from the cluster analysis. The first, labeled *low stressor/low stress effect* (p. 1785), was characterized by perceived low stressors and higher social support mechanisms in their work area, combined with low reported levels of burnout, affective, and physical symptoms. This first group experienced relatively high levels of patient symptom interactions, leading Hillhouse and Adler (1997) to conclude that increased patient contact alone did not create stress-related symptoms. A second group was identified as *high stressor and burnout/moderate symptom* (p. 1786) and was distinguished by perceived moderate levels of physical and several affective symptoms, combined with high burnout. The second cluster was difficult to classify, as they scored high on some nursing stressor scales and low on others. They reported fewer patient interactions than the first group but a greater incidence of conflicts with other nurses (intraprofessional) and with physicians (interprofessional). The third grouping, identified as *high stressor/high stress effect*, (p. 1786) reported increased levels of affective and

physical symptoms, perceived stress and patient interactions, together with a decreased incidence of support mechanisms.

Hillhouse and Adler (1997) surmised that adverse symptomatology is a two-stage process involving a combination of nursing stressors and diminished intraprofesssional or interprofessional relationships. The researchers concluded that managers should monitor the workload stressors mentioned to identify those most likely to be adversely affected so interventions could be made. Increased education and the development of interdisciplinary treatment teams was seen as an approach to increase respect and interpersonal relationships. Providing mechanisms for group collaboration was recommended for improving conflict resolution.

Jamal and Baba (2000) conducted a study of job stress and burnout using two groups in an eastern Canadian city: RNs and managers. Given stress was among the most serious occupational hazards of industrialized nations, and citing reports indicating stress-related problems cost American organizations in excess of $150 billion each year, Jamal and Baba chose to include the variables of both stress and burnout in their study.

Questionnaires were distributed to 340 hospital-based nurses, of which 175 (51%) were returned. Managers participating in an evening Master of Business Administration program were also issued questionnaires. These had engineering and other backgrounds and were not nurse managers. Of the 75 managers sampled, 67 (89%) returned documents for analysis by researchers.

The nursing group was predominantly female (67%) and had an average age of 39.3 years. The mean seniority length was 12.1 years. It is presumed these were RNs, but an actual description was not provided. The managers were mostly males (72%) with an

average age of 31years.

Job stress was measured using a scale developed in 1983 by Parker and DeCotiis. Burnout was assessed using the Maslach Burnout Inventory (MBI) and the Hoppock Scale was employed to measure job satisfaction. Organizational commitment and psychosomatic health problems were also measured. Reliability estimates ranged from a low of 0.67 for the lack of accomplishment subscale of the MBI to a high of 0.93 for psychosomatic health.

A number of low to moderate correlations were determined. For the nursing group, Jamal and Baba (2000) found that job stress was negatively correlated with job satisfaction (r = -0.34) and organizational commitment (r = -0.20). Occupational stress was positively associated with overall burnout (r = 0.56) and the emotional exhaustion subscale of the MBI in particular (r = 0.58). Stress was also correlated with psychosomatic problems (r = 0.55) and, when gender was treated as a moderator, the female nursing sample with high stress scores experienced more health problems than male managers with high stress scores. All correlations were statistically significant.

Rather than focus on practitioners, Mahat (1998) used a different approach and investigated occupational stress among nursing students. She sought to identify the perceived stressors of junior baccalaureate nursing students during their initial clinical rotation and the coping techniques most often employed, based on the cognitive appraisal theory of stress advanced by Lazarus and Folkman (1984).

Mahat (1998) proposed three research questions which were: (a) What do junior baccalaureate nursing students perceive as stressors in the clinical settings? (b) How do junior baccalaureate nursing students cope with the identified stressors? and (c) Was

there a relationship between perceived stressors and coping strategies utilized by junior baccalaureate nursing students in the clinical setting? The researcher distributed questionnaires to all junior baccalaureate nursing students at a college in the northeastern United States, from which 107 were received. The total sample size was 194, for a response rate of 55%.

Following an instrument pilot study, the Critical Incident Technique Tool (CITT) was used to assess perceived stressors. Students wrote down key information about the most stressful incident occurring during their clinical experience, such as a description of the occurrence, names of those involved, and how the matter was resolved. Participants also provided a written account of their coping strategy for the incident. Perceived stressors from the CITT were then classified into five groups. These were (a) initial experiences, (b) interpersonal relationships, (c) ability to perform roles, (d) heavy workload, and (e) feelings of helplessness. The coping mechanisms described by students were also classified according to the Lazarus and Folkman (1984) theoretical model.

The stressor most frequently cited in the study was the student's initial clinical experience (34.5%), which included activities such as administering injections, dispensing oral medications, and interacting with patients for the first time. Close behind was interpersonal relationships (27.1%), which consisted mostly of problems interacting with instructors and also with nurses at the rotation site. The ability to perform roles was next with a frequency of 23.4%. This included aspects such as inadequate preparation, performing under close supervision, and fear of harming the patient.

Mahat (1998) asserted that this was consistent with previous research and that "regardless of where the study was done, nursing students perceived negative

interpersonal relationships with their instructors" (p. 16). Furthermore, students rarely sought assistance or support from experienced nurses, while faculty members assumed this was occurring.

Stress in Nurses and Karasek's Job Demand-Control Model

A consistent message in empirical studies is that workload is a source of occupational stress. Some have suggested that the concepts of workload and effort have been confounded (see NIOSH, 1999). However, workload has emerged as a major dimension in most studies. This is supported by investigations in which the JD-C model was used as the underlying theory. In Karasek's (1979) model, workload was a dimension of the job demands factor which contributed to job strain.

A research team from the Harvard School of Public Health published data collected on an astounding 21,290 RNs. Cheng et al. (2000) found that female nurses in positions characterized by low control or autonomy and high demands showed declining health scores on a variety of assessments. Based on the JD-C model of stress proposed by Karasek (1979) and Karasek and Theorell (1990), they examined job strain and its association with various physical health outcomes. The longitudinal study indicated that women with higher autonomy and lower demands were in better health over the 4-year period.

The findings of Cheng et al. (2000) were based on a 1996 survey during which data were collected using Karasek's (1985) questionnaire and a 36-item health questionnaire (SF-36) used in other studies. This was one of the few healthcare-related investigations to utilize Karasek's instrument; however, the physiological dimensions

measured by the JCQ made its selection understandable. The respondents had been part of a larger longitudinal health study of 121,700 women in 1976, from which 75,434 participated in an initial job stress survey in 1992. The 21,290 participants represented working nurses in 1996.

As stated previously, the JCQ contains subscales on job demands, decision latitude, and coworker support. Seven of the eight subscales of the SF-36 were used, which included physical functioning, role limitations due to physical problems, role limitations due to emotional problems, freedom from pain, vitality, social functioning, and mental health. Job demands decreased slightly and job control increased slightly during the 4-year interval.

Cheng et al. (2000) found that women with scores in the highest third of job demands and the lowest third of decision latitude had the worst reported health status on items such as physical functioning, vitality, and mental health. Consistent with Karasek's (1979) job strain model, those with highest control and lowest demands reported better health, and this can be hypothesized to impact turnover among the nursing profession. According to Cheng et al., "healthier employees are more likely to remain working whereas those with health problems may shift to jobs with lower strain or quit work altogether" (p. 1435).

Sparks and Cooper (1999) utilized the JD-C model to examine the degree to which a range of various factors lead to job strain which can affect the well-being of workers. The control dimension of Karasek's (1979) model was added to six sources of pressure to form seven job characteristics. The influence of these characteristics on mental and physical health was investigated.

The sample consisted of 7,099 employees from 13 various occupations, many outside of healthcare. These included (a) pharmacists (1,104), (b) anesthetists (564), (c) physicians (725), (d) administrative healthcare workers (94), (e) paramedics (93), (f) nursing staff (257), (g) senior civil servants (1,032), (h) government workers (951 in one group and 861 in the second), (i) air traffic controllers (634), (j) public utility employees (522), (k) telecommunications engineers (128), and (l) accountants (134). No further description of *nursing staff* (Sparks & Cooper, 1999) was provided, so it is not known whether these were RNs or a combination of licensed and unlicensed staff. Likewise, *administrative healthcare workers* was not defined and might have included hourly clerical personnel working various shifts in a hospital and managerial-level personnel.

Sparks and Cooper (1999) distributed the Occupational Stress Indicator (OSI) to the participants. Cooper, considered a leading authority on occupational stress, has authored numerous research articles and books on the subject and has published several studies on stress in the healthcare occupations (e.g., Evers, Frese, & Cooper, 2000; Moore & Cooper, 1996). He was co-author of the OSI (Cooper et al., 1988), the predominantly cited scale in the literature and used in a number of healthcare studies (e.g., Proctor, Stratton-Powell, Tarrier, & Burns, 1998; Rees, 1995; Sweeney & Nichols, 1996).

The OSI has seven components: (a) sources of pressure, with six subscales; (b) coping, consisting of five subscales; (c) locus of control, with three subscales; (d) Type-A behavior, comprised of three subscales; (e) job satisfaction, with six subscales; (f) mental ill-health, measured with one subscale; and (g) physical ill-health, with one subscale. For their study, Sparks and Cooper (1999) used the sources of pressure subscale which

contained 61 items and measured six aspects of work. These were combined with the composite locus of control score to form independent variables, serving as seven job characteristics for the study.

The six subscales of the OSI sources of pressure dimension are (a) factors intrinsic to the job, such as work overload, hours of work, and decision making; (b) the organizational role, such as role ambiguity, role conflict, the implications of making mistakes, and lack of power; (c) relationships with others, such as workplace politics, supervising others' work, and social support on the job; (d) career and achievement, such as development opportunities, prospects for promotion, and feeling undervalued; (e) organizational structure and climate, such as communication, training, and morale; and (f) home-work interface, such as stability of home life, spousal attitudes, and demands of work on family relationships. The 12-item locus of control scale, which Sparks and Cooper (1999) used to assess worker control, measures individual perceptions of their control in work settings. The dependent variables of mental and physical health were measured using the corresponding subscales on the OSI. The mental health subscale has 18-items, and the physical health measure contains 12.

Reliability estimates on the sources of pressure scale ranged from 0.70 to 0.87 in previous studies. For the work control scale, coefficient alphas of 0.60 to 0.79 were reported. Reliability measures of 0.78 to 0.89 were stated for the mental health assessment and 0.70 to 0.82 for physical health.

Sparks and Cooper (1999) used analysis of variance and correlation analysis to examine the relationships between variables. They found that pharmacists, physicians, and nursing staff scored significantly higher on the organizational role facet of the

sources of pressure subscale. As stated previously, this includes items such as role ambiguity, the implications of one's mistakes, and lack of power, which are common concerns for these healthcare occupational groups. All seven of the independent variables were significantly correlated with mental and physical health across the 12 occupations. Sparks and Cooper maintained that this occupational comparison provided support for situation-specific models.

In 1999, four academic researchers tested the JD-C model on 1,489 healthcare workers in the Netherlands. De Jonge, Van Breukelen, Landeweerd, and Nijhuis (1999) selected eight hospitals and eight nursing homes for participation and within those distributed surveys to participants. Employees working in intensive care, psychiatric, internal medicine, surgical, somatic, or psychogeriatric departments were selected to participate, including nurses, student nurses, nursing assistants, activity therapists, secretaries, and kitchen staff. Registered nurses accounted for 895 of the respondents. Eighty-four percent (84%) of all participants were female, and the mean age was 30.7 years.

Job demands were measured using an 8-item questionnaire developed by De Jonge, Van Breukelen, et al. (1999) in a previous study, for which a Cronbach's alpha coefficient of 0.85 was reported. Also utilized were two scales developed by De Jonge in 1995: the 10-item Maastricht Autonomy Questionnaire (MAQ), with a reliability coefficient of 0.81 and 5-item work motivation scale, with a reliability coefficient of 0.87.

Emotional exhaustion, an attribute of burnout, was measured using a subscale of the Dutch version of the MBI for which a coefficient alpha of 0.85 was cited. Job-related

anxiety was appraised by means of a subscale of the Dutch Organizational Stress Questionnaire. The scale consisted of four items and had a Cronbach's alpha coefficient of 0.78. A measure of job satisfaction was derived from a single item.

De Jonge, Van Breukelen, et al. (1999) employed hierarchical linear regression that permits researchers to determine the order of the variables based on their theoretical understanding of the concept. Using the computer program Variance Component Analysis by Maximum Likelihood, the research team found that higher levels of individual job demands were associated with higher levels of emotional exhaustion and job-related anxiety. When the data were aggregated, higher levels of job autonomy were associated with higher levels of job satisfaction, indicating support for Karasek's (1979) model. They concluded that it was appropriate for job stress research and that future studies should focus more on working conditions.

Burnout in Nurses

The origin of the term *burnout* is attributed to the work of Freudenberger (1975), but Maslach (1976) is considered the primary theorist in this area. Burnout is expressed along three core dimensions: (a) *emotional exhaustion*, (b) *depersonalization*, and (c) *reduced personal accomplishment* (Maslach, 2000). *Emotional exhaustion* is characterized by a helpless feeling of being drained and depleted of one's emotional resources. *Depersonalizatio*n involves a sense of detachment from other people, often expressed as uncaring or impersonal responses. A lack of *personal accomplishment*, or a reduction thereof, refers to feelings of inadequacy and diminished self-worth on the job. The MBI, developed by Maslach and Jackson (1981), has been viewed by researchers as the principal instrument for the collection of burnout data.

While the subject of burnout is important to the study of occupational stress, it should be emphasized that they are separate constructs in the literature. Each term has a distinct theory and definition. Researchers, nonetheless, often write about one when referring to the other, and sometimes use the terms interchangeably (De Jonge, Van Breukelen et al., 1999; Gueritault-Chalvin, Kalichman, Demi, & Peterson, 2000; Jamal & Baba, 2000; Ogus, 1995). According to Brewer and Clippard (2002), burnout has been linked to high job demands and decreased decision latitude, which are important concepts to the present study.

Iverson, Olekalns, and Erwin (1998) examined how positive and negative affectivity influenced individual impressions of role stress, burnout predictors, and social support in a study from the University of Melbourne. They also examined the behavioral outcome of absenteeism and attitudinal consequences of job satisfaction. They described positive affectivity as a tendency to view the environment in a relatively favorable and optimistic manner and negative affectivity as a predisposition to perceive events as being ominous and gloomy. Iverson et al. stated that previous research found relationships between affectivity and stress, but investigations into their relevance to burnout were lacking.

Participants in the study were employees of a public hospital in an unidentified Australian city. Approximately 2,000 employees worked at the facility, and Iverson et al. (1998) distributed survey forms to a random sample of 1,100 workers. A response rate of 74% yielded 812 returned instruments. The investigators needed to match attendance records and other identifiers to those responding, requiring 325 forms to be discarded due to missing data. This resulted in 487 questionnaires being retained for the study. Females

accounted for 74% of participants, and the average age of respondents was 33.4 years. The *white-collar* professions of nurses and other clinical disciplines represented 93% of respondents, while 7% represented the *blue collar* occupations of ward assistants and other support staff.

Burnout was measured using an abbreviated version of the scale developed by Maslach and Jackson in 1981. Employee perceptions of 11 dimensions were measured using a 5-point Likert-type scale, a copy of which was provided by the writers in an appendix. Some items contained as few as three measurements, such as the positive affectivity dimension, while others contained as many as six, such as the role stress dimension. Positive and negative affectivity was each assessed by an adaptation of the Multidimension Personality Index. Other instruments were used to collect data on support mechanisms, autonomy, role stress, workload, and job satisfaction. Each had been developed by previous researchers and little information was provided, except for Cronbach's alpha coefficients which ranged from 0.65 to 0.91. The rate of absenteeism was determined by cross-referring the participants to actual attendance records.

Iverson et al. (1998) found support for the causal model that negative affectivity was associated with decreased social support (r = -0.28) and burnout (r = 0.93). At the same time, positive affectivity was associated with increased peer support (r = 0.29), autonomy (r = 0.32), and lower incidence of burnout (r = -0.36). The research team used path analysis to consider the data in terms of indirect, direct, and total effects. They determined, for example, that workload, negative affectivity, and positive affectivity had the greatest total effect on the burnout determinant of emotional exhaustion (in that order). Negative affectivity had the greatest total causal impact on the burnout variable of

depersonalization, while workload and positive affectivity had the highest total effect on the personal accomplishment factor. Practically all dimensions of burnout as well as the variables of positive and negative affectivity, role stress, and autonomy had significant total impact on job satisfaction. Consistent with the findings of Hemingway and Smith (1999), there was not a strong relationship between burnout and absenteeism.

Layman and Guyden (1997) discussed the relationship between personality types and coping mechanisms to stress-related burnout in healthcare. They asserted that specific personality types are vulnerable to burnout and that an understanding of these, together with knowledge of their inherent strengths and weaknesses, can provide the healthcare worker with some measure of protection through coping strategies. They used the Myers-Briggs Type Indicator (MBTI) as a basis for their discussion, as prior research indicated that a relationship existed between certain MBTI personality types and susceptibility to burnout.

They identified those predisposed to experience burnout in a healthcare setting and discussed various interventions and avoidance strategies. They viewed burnout as a particular phenomenon of work and the result of exposure to prolonged stressors experienced on the job. Employees of the people or helping professions, such as healthcare, were particularly vulnerable to the burnout syndrome.

According to Layman and Guyden (1997), prior research focused on the incidence of burnout in various work settings. Previous studies of hospital-based workers examined the relationship between burnout and intensive care units or emergency centers. Other investigations considered individual characteristics such as age and gender, while others considered occupational stressors such as lack of adequate staffing and increased work

loads. Prior studies had focused on various types of coping mechanisms that individuals utilize to manage occupational stress and burnout. According to Layman and Guyden's review of literature, the relationship between all of these variables have been researched and well documented. They introduced personality into the investigation of burnout, maintaining that the results were useful to managers in the identification and intervention of its negative effects.

Layman and Guyden (1997) relied on the MBTI to supplement their theories with a number of related research studies. They also cited Jung's personality theory, which Myers and Briggs used in the development of their classic instrument. Given that they used 63 references in the publication, many of which were specifically related to healthcare, it was suggested that burnout among health service workers was fertile ground for research.

According to Layman and Guyden (1997), the MBTI types of extroversion, intuition, and thinking were resistant to burnout. The extroverted are identified as being approachable, social types who are invigorated by stimuli. Intuitive types are goal-oriented and good problem-solvers, according to MBTI developers. The personality type of thinking was also associated with problem-solving skills. Healthcare workers reporting these types of preferences were determined to be better equipped to manage and resolve job-related stress.

The MBTI types of introversion, sensation, and feeling were associated with vulnerability to burnout. The introverted personality type is the most at risk, according to the study. The modern healthcare setting requires numerous interpersonal contacts due to increasing volumes and leaner organizational structures, as well as numerous meetings

where group process skills are a preferred skill. The introverted preferred to reflect inwardly on their ideas and were seen as being at a disadvantage. A preference for sensation indicated an inclination to use past behavior to foster decision making. Major changes in healthcare requiring quick thinking may be overwhelming to this personality type, increasing the risk of occupational stress. Layman and Guyden (1997) contended that thinking types preferred to place a greater emphasis on human relations than other healthcare decision-makers, which led to conflict and stress.

The MBTI types of judging and perceiving were not associated with a high or low incidence of burnout. The researchers also considered various coping mechanisms for those susceptible to professional burnout. For the introverted these included scheduling private time during the workday (if possible) and obtaining agendas in advance of meetings. Those with a preference for sensing often demonstrate prowess at observing and fact-finding. These can be turned to the individual's advantage, stated Layman and Guyden (1997), who recommended emphasizing the advantages of participatory management for those who related to the feeling type.

Ogus (1995) examined burnout and coping strategies among medical and surgical nurses. She referred to previous research which indicated that burnout among nurses was found to be related to decreased morale and lower performance outcomes. Ogus postulated that burnout and negative coping strategies would be positively correlated, while nurses who used positive coping strategies would show less burnout. The researcher also hypothesized that medical nurses would experience greater stress and burnout than surgical-based nurses.

Participants were 128 female registered nurses representing three major

community hospitals in a large urban setting in Canada. Forty-one percent were married and the median age was 26 years. All were full time assigned to various full time shifts throughout the 24-hour day. Surgical nurses provided care to patients with a relatively short length of stay and who were typically younger than other patient populations. The remaining 62 nurses worked on a medical unit. Medical nurses typically worked with the chronically ill who were often older patients that required constant care.

Managers issued survey instruments in confidential envelopes to their nurses, who were assured that participation was voluntary. Questionnaires were returned by 128 of the 237 surveyed, for a response rate of 54%. The MBI was used to measure burnout and Cronbach's alpha coefficients for internal consistency were 0.90 for the emotional exhaustion subscale, 0.79 for personal accomplishment, and 0.71 for the depersonalization measurement. Ogus (1995) also utilized the Nursing Stress Inventory which used a Likert-type scale to measure factors such as work environment, administrative support, and interpersonal conflicts. Alpha coefficients for these ranged from 0.86 to 0.89. The Nursing Stress Inventory should not be confused with the Nursing Stress Index, developed by Harris (1989). The latter is more prominent in the literature and is described in detail below.

The Coping Inventory was used to capture responses along four scales that indicated how the participant preferred to deal with certain job pressures. These four measures were (a) palliative coping, which consisted of wishful thinking, self-blame, and denial/escape; (b) internal control, a measure of how much an individual's own efforts can change the circumstances; (c) preventive coping, described as self-help techniques aimed at maintaining good mental health; and (d) existential coping, which involved a

healthy acceptance of life events.

Ogus (1995) computed correlation coefficients between burnout, stress, and coping preferences. As expected, she found significant positive correlations between stress and burnout ($r = 0.55$). She also conducted correlational analysis on burnout and the four coping scales. She found significant positive relationships between palliative coping and burnout ($r = 0.53$) and significant negative correlations between burnout and preventive ($r = -0.35$) and existential coping ($r = -0.23$). She also found that nurses working on the medical units experienced greater burnout than their surgical counterparts. Further, medical nurses employed negative palliative forms of coping while those on surgical units relied on preventative and existential techniques. As a coping measure, internal control yielded no remarkable relationships.

Medical nurses experienced more burnout and had poorer coping skills than their surgical counterparts. Ogus (1995) stated that this could be attributed to a number of factors that hospital managers should consider. Medical patients with chronic problems are less likely to have a specific diagnosis than surgical patients. This ambiguity is typically accompanied by diminished feedback from physicians, which can lead to the medical caregiver feeling less competent about treating and recovering their patients. Surgical nurses have more independence than others in terms of decision-making and care plan development. These factors assist with coping mechanisms. Recommended strategies for coping skill development included relaxation training, desensitization instruction, and cognitive restructuring.

Burnout in Nurses and Karasek's Job Demand-Control Model

Researchers have found that nurses exhibit characteristics associated with burnout (Iverson et al., 1998; Layman & Guyden, 1997; Ogus, 1995). Theory suggests that Karasek's (1979) JD-C model is related to this concept. However, only a few burnout studies have used the JD-C model as a theoretical basis (De Jonge, Mulder, et al., 1999; De Rijk et al., 1998).

De Rijk et al. (1998) studied burnout in the context of Karasek's (1979) JD-C model. This study highlighted a criticism of Karasek's theory that although job demands and control may predict occupational stress outcomes, their interactive effects are sometimes inconclusive. De Rijk et al. therefore postulated that a more descriptive measure of job control was needed.

They further hypothesized that active coping was a moderator of the job strain model and that its interaction effects could be predicted. A moderator is a variable that influences the relationship between two other variables, thereby creating an interaction effect. Active coping was described as the process of actively and definitively controlling for stressors on the job by cognitively analyzing the problems and taking real measures to deal with them.

Questionnaires were distributed to 578 intensive care unit (ICU) nurses working in the Netherlands, of which 367 were received for a 65% response rate. Women constituted 56% of the respondents and the mean age was 34 years. In the perception of the research team, ICU nurses were an ideal sample to study because they are subject to heavy workloads and have limited autonomy.

Job demands were measured using an 8-item questionnaire published by De Jonge in 1993, which De Rijk et al. (1998) determined was more descriptive of the concept than tools used by previous researchers. Cronbach's alpha coefficients for this instrument were 0.87 and 0.90 in two previous studies. Active coping was assessed using a corresponding subscale of the Utrecht Coping List. The emotional exhaustion and depersonalization subscales of the Dutch version of the MBI, described previously, were used to assess burnout. Need for control was measured by a 4-item scale developed for the study. No reliability measures were reported for the latter three instruments, except for a notation that the reliability of the Dutch version of the MBI was comparable to the original American edition.

In order for De Rijk et al. (1998) to control the independent variables, hierarchical regression analysis was conducted. They failed to find a significant interaction between demand and control as predicted by Karasek's (1979) original model but did determine a significant association between job demands and active coping (ß = 0.46). Likewise, job control and active coping were negatively associated with exhaustion (r = -0.19 and r = -0.18, respectively). A significant three-way interaction effect for job demands, job control, and active coping was determined. This supported their hypothesis that active coping moderated the interaction between the two job strain model concepts. For the dependent variable depersonalization, no significant main or interaction effects were determined.

De Jonge, Mulder, et al. (1999) conducted a similar study of burnout based on the assumptions of Karasek's (1979) model. They used structural equation modeling (SEM) to test the JD-C theory using various dimensions of job demands (physical, emotional,

and psychological) in combination with job autonomy, a specific dimension of decision latitude. With these, they predicted various outcomes such as job involvement, job satisfaction, emotional exhaustion, and psychosomatic complaints.

Participants were 212 healthcare professionals from 15 Dutch organizations. Specific occupational counts were not given but included nurses, physicians, social workers, and therapists. Females accounted for 71.7% of the sample, and the mean age was 36.3 years.

Psychological demands were assessed using an 8-item questionnaire designed by De Jonge in 1993. No reliability coefficent was reported. De Jonge also developed the 8-item instrument to measure physical demands in the same year, with a reported Cronbach's alpha of 0.91. No descriptive information was provided on the 4-item instrument used to gauge emotional demands. Job autonomy was assessed using the 10-item MAQ, and emotional exhaustion was measured using the Dutch version of the MBI, both described previously (De Jonge, Van Breukelen, et al., 1999). Job satisfaction and job involvement were measured using single-item scales. A low reliability measure was reported for the former (0.55); no coefficient was reported for the latter. Psychosomatic health complaints were assessed from a combination of two existing instruments. A reliability measure of 0.79 was reported for one of the scales.

It was the opinion of De Jonge, Mulder, et al. (1999) that their study did not result in substantial support for Karasek's (1979) model. For example, the coefficients of multiple determination of the outcome variables ranged from $R^2 = 0.11$ to 0.24, which were poor goodness-of-fit indicators. However, those findings that did support the JD-C theory were significant. For example, jobs high in strain (those with high demand and

low autonomy) were associated with low scores in job satisfaction (ß = 0.43) and job involvement (ß = 0.18). Jobs theoretically labeled as active (those with high demand and autonomy) were significantly associated with higher job involvement scores and moderately higher job satisfaction scores. Psychological job demands were related to emotional exhaustion, but emotional demands were not, which was surprising.

Occupational Stress and Turnover Among Nurses

As stated previously, the turnover of nursing and other healthcare personnel adds to the difficulties of finding sufficient staff where shortages already exist. A number of studies have examined the relationship between stress and turnover. Since the early 1980s, researchers have used the concept of intention to quit, or turnover cognition, to predict actual turnover.

A recent cross-national study sponsored by the International Hospital Outcomes Research Consortium compared a sample of more than 40,000 RNs in five countries (Aiken et al., 2001). The consortium, formed by the University of Pennsylvania, sought to collect data on organizational climate, including turnover intention, as well as nurse staffing and patient outcomes. It was hypothesized that workforce management problems would continue to fuel the growing shortage of nursing personnel in Western countries and add to ever increasing turnover rates.

Aiken et al. (2001) administered survey instruments to 43,329 nurses working in 711 adult acute care hospitals in 1998 and 1999. These were (a) 13,471 from Pennsylvania in the United States; (b) 17,450 from Ontario, Alberta, and British Columbia, Canada; (c) 5,006 in Great Britain; (d) 4,721 in Scotland; and (e) 2,681in

Germany. The core instrument was developed in collaboration with teams from all represented nations and pilot tested locally. The MBI was also administered to collect data on the three classical dimensions of burnout (emotional exhaustion, depersonalization, and lack of personal accomplishment).

With respect to the statistics cited, it was not specified if these were sample sizes or the number responding. Reported response rates ranged from 42% to 53%. Likewise, no gender or similar descriptive statistics were provided.

Aiken et al. (2001) reported a number of important findings related to job burnout, satisfaction, and turnover intention. Forty-one percent of nurses working in the United States reported dissatisfaction with their present job. By comparison, 32.9% of Canadian nurses, 36.1% of English nurses, 37.7% of Scottish nurses, and 17.4% of German nurses reported dissatisfaction. When comparing against norms established for the MBI, 43.2% of American nurses reported high burnout scores. The same was true for 36.0% of nurses working in Canada, 36.2% of those in Great Britain, 29.1% of Scottish nurses, and 15.2% RNs in Germany.

The percentage of nurses under the age of 30 was markedly less in North America than Western Europe. For the United States this figure was 19.0% and for Canada it was 10.3%. In England, 40.6% of RNs are less than 30 years old, as compared to 31.9% in Scotland and 33.6% in Germany. Aiken et al. (2001) examined this factor against turnover intentions. The percentage of all RNs surveyed who planned to leave their present job in the next year was 22.7% in the United States, 16.6% in Canada, 38.9% in Great Britain, 30.3% in Scotland, and 16.7% in Germany. For those under the age of 30, the statistics were even higher.

The percentage of American nurses less than 30 years of age planning to leave their present job within the next year was 33.0%, or one-third. For those working in Canada this was 29.4%; in England, 53.7%; in Scotland, 46.0%; and in Germany, 26.5%. Combine this with decreasing nursing school enrollments and an aging workforce in general, and the importance of interventions for job-related stress and turnover to HRD professionals is underscored.

Aiken et al. (2001) also found relatively low numbers of nurses who perceive staffing levels at their hospitals to be adequate. A low of 29.0% of nurses in England said there were sufficient RNs to provide high-quality care, to a high of 38.1% in Scotland. In the United States this proportion was 34.4%. Similar findings were obtained for perceptions of staffing (non-nursing) in general.

Workforce management issues were also identified by respondents. For example, only 29.1% of American nurses reported that administration listened to and responded to nurses' concerns. This was the lowest proportion in the category, compared to a high of 44.5% in Germany (and 44.5% is not that high). Nurses are also concerned about career advancement in the present environment. Registered nurses reporting opportunities to move up ranged from 20.9% in Canada to 61.0% in Germany. In the United States, 32.2% perceived there to be advancement opportunities for them in the future.

The patient care environment is suffering from the effects of nursing and staffing shortages, according to Aiken et al. (2001). In America, 52.7% of the RNs reported being the recipient of verbal abuse during the past year. In Canada, the proportion of nurses experiencing this was 61.2%. Apparently the nursing workforce receives the brunt of patient dissatisfaction during busy and stressful times.

Cangelosi, Markham, and Bounds (1998) also examined the relationship between turnover and stress in nursing. They found that nurses reported high levels of occupational stress and were likely to change employers due to stress-related reasons. Respondents reported fairly positive job satisfaction scores, but those who reported increased stress levels correspondingly reported lower levels of job satisfaction.

Questionnaires were administered to nurses working in six hospitals, ranging in size from 100 to 250 beds, in the southeastern United States. The number responding was 285, but no information about sample size was provided. Of these 285, RNs represented 62.1% of the participants with the remaining 37.9% coming from LPNs. Females accounted for 87.4% of those responding. Most of the participants (72.3%) were in the 25 to 44 age range. At each participating hospital, the nurse administrator issued the questionnaires and cover letters, and the participant returned the completed forms to this same individual. This may have influenced the response rate.

Following interviews with physician and nursing subject matter experts, Cangelosi et al. (1998) constructed the survey items specifically for their study. These included a 5-point job satisfaction scale and a 28-item turnover instrument, framed as major and minor reasons a nurse would change jobs. Adequacy of feedback was measured using a 4-point rating scale and job-related stress was assessed using a 5-point instrument. Except for the turnover instrument, the number of items for each scale was not reported.

Forty-two percent (42%) of those responding rated job-related stress a major reason nurses change jobs. Only three items scored higher on this dimension. These were (a) higher pay (55.2%), (b) work closer to home (46.1%), and (c) better work schedule

(42.0%). Interestingly, 33% of those participating stated stress was not a reason nurses changed jobs, and 25% indicated it only constituted a minor reason.

The majority of nurses (56.4%) reported that their jobs were *always* or *often* stressful, leading Cangelosi et al. (1998) to conclude correctly that "stress is a fact of life for nurses" (p. 38). Of these, nurses assigned to the emergency center had the highest response rate at 73%. This was followed by 62% of medical-surgical nurses indicating they experienced stress always and often, then by 59% of nurses assigned to intensive care or coronary care units.

Despite these stress levels, 83.8% of all respondents were either somewhat satisfied, satisfied, or very satisfied with their current jobs. Cangelosi et al. (1998) stated that these results were from participants who had changed employers at least once. After one or more job changes, job satisfaction among these nurses appeared to increase, due in large part to increased salary levels. The number of individuals who had actually changed employers was not indicated.

In a simple correlational analysis of the data, Cangelosi et al. (1998) indicated that the strongest association was between job satisfaction and occupational stress. A low to moderate inverse relationship ($r = -.331$) was interpreted to mean that those who experience more job-related stress are less satisfied with their job. A small but significant relationship ($r = .202$) between training level and propensity to change jobs was found, suggesting that it is easier for higher skilled nurses to find work elsewhere. A low but significant association ($r = .218$) was also found between receiving feedback from supervisors and job satisfaction.

Cangelosi et al. (1998) suggested that hospital administrators respond to staff

needs in order to deal with the present shortage of nursing personnel. Specifically, they recommended that management implement job rotation and flexible schedules to alleviate the effects of stress and turnover on hospital operations. Strengthening award and recognition programs and exploring the practicality of adding on-site day care were also suggested as strategies for healthcare executives to consider.

Taunton, Boyle, Woods, Hansen, and Bott (1997) conducted a study regarding antecedents of turnover among RNs, which included occupational stress as a factor. Based on their previous work, they sought to operationalize the underlying theory of the Organizational Dynamics Paradigm of Nurse Retention. This model postulated that nursing retention was related to four predictor variables: (a) manager characteristics, (b) organizational characteristics, (c) work characteristics, and (d) nurse characteristics.

Survey questionnaires were distributed to RNs and nurse managers working at four hospitals in a Midwestern city. A total of 1,171 RNs participated for a 67% response rate. The average age was 35.8 years and the average tenure in the current position was 4.2 years. Registered nurses holding a baccalaureate degree accounted for 47.6% of the sample. The number of nurse managers participating totaled 95, which resulted in a 97% response rate. Females represented 95% of the management group. The average age was 38.7 years and the average tenure in the current position was 4.8 years. Sixty-seven percent (67%) of nurse managers held a baccalaureate degree.

Taunton et al. (1997) selected a subsample of the RNs that included an equal number of leavers (those choosing to leave during the 6-month study period) and stayers (124 of each). By doing this, they sought to offset a negatively skewed retention distribution. The modified sample was similar to the larger group on demographic

characteristics.

A number of variables were assessed using researcher-developed instruments from studies conducted in 1983 and 1986. These included job stress, intent to stay, autonomy, control over practice, promotional opportunities, communication, and job satisfaction. Factor analysis was conducted on all dimensions, resulting in updated scales. Job stress, originally comprised of five dimensions, was factor analyzed further into personal stress and situational stress.

Retention was measured using three indicators of turnover, unit separation, and retention. Manager power characteristics were based on a 1968 study and resulted in two scales representing position and personal power. Influence was assessed by two items measuring influence over personnel resources and influence over work activities. Leadership style was assessed using items from 1973 and 1983 studies. Control over practice was measured using a single item. Job satisfaction was assessed using the dimensions of enjoyment and satisfaction with administration, which represented the nurse managers' impact on the RNs.

The 124 nurses who left during the research period represented 10.6% of the sample, whereas turnover ranged from 4% to 12% across the four hospitals. The average *leaver* remained for 44% of the study period. Taunton et al. (1997) found that personal consideration from managers influenced turnover. Using the modified sample of 248, the multiple regression output indicated that incremental increases in explained variance of retention was .06 for manager characteristics, while intent to stay added another .11.

High job stress scores were associated with low intent to stay (semipartial $r = -.15$), and predicted unit separation and turnover. Taunton et al. (1997) contended that

while high stress was associated with turnover intentions, low stress was not necessarily association with retention. As predicted by Karasek's (1979) model, autonomy in decision-making was also predictive of both unit separation and turnover. It was the position of Taunton et al. that "intent to stay or the converse, intent to leave, consistently have been the best predictors of turnover" (p. 220).

Fang and Baba (1993) examined the direct relationship between stress and turnover intention using a nursing population. Their empirical investigation found that the stressors of role ambiguity, role conflict, and role overload were significant predictors of stress, which in turn significantly predicted turnover cognition. They proposed that intention to quit was a direct result of occupational stress, in contrast to other researchers who hypothesized that turnover intention was mediated by attitudinal variables such as social support and job satisfaction.

Survey instruments were mailed to 2,236 RNs in Canada, which were divided into two groups. The number of respondents working at three general hospitals in the Montreal area was 689. Of these, females accounted for 97.6%. Participants on staff at five specialized hospitals in the same proximity totaled 441. No gender information was provided for the specialty hospital group. An average response of 51% for each facility was reported. The final participation numbers were reduced to 662 and 420 respectively when recent new hires were eliminated from the study.

Role ambiguity, role conflict, and job satisfaction were measured using scales developed in previous research studies. Role overload was assessed using a scale created by Fang and Baba (1993) in an earlier study. Stress, which was hypothesized to mediate the relationship between the three role stressors and turnover intention, was measured

using a 9-item questionnaire developed by Parker and Decotiis, described earlier. Turnover cognition was assessed using a single item.

Items unique to the study were also developed in order to measure a number of hypothesized moderator or attitudinal variables. These were (a) perceived internal and external opportunities, (b) social support, including family and friends as well as workplace relationships, (c) external applicability of knowledge, and (d) personal experience.

Fang and Baba (1993) used SEM to measure the structural relationships among latent variables, employing the software program LISREL. Based on LISREL parameter estimates, they found that role ambiguity, role conflict, and role overload jointly influenced stress, explaining 51% of the variance in the general hospital sample. The relative influence of each on stress varied, however. Role overload alone accounted for the variance in stress twice as much as that of role conflict and 12 times as much as role ambiguity. This is indicative of the JD-C model proposed by Karasek (1979).

The LISREL output also indicated that stress, in turn, was a significant predictor of turnover intentions, accounting for 16% of the explained variance. Given these results, Fang and Baba (1993) concluded that stress was a significant but limited contributor to turnover cognition and called for additional research on the model. The variables of perceived opportunities, social support, and personal experience were not found to moderate the relationship between stress and turnover.

The results of the specialty hospital data were similar to those of the general hospital. The three role stressors together influenced stress significantly, accounting for 36% of the variance. Likewise, stress influenced turnover intentions, explaining a

relatively small 7.6% of the variance. The hypothesized moderating variables were found to have no significant impact on the relationship between stress and turnover cognition.

According to the LISREL output, the adjusted goodness-of-fit index (AGFI) for both sets of data was above the generally acceptable level of 0.90. The characteristics of the two samples diverged when stress was removed as an independent variable. Role conflict and role overload were significantly related to turnover intention in the general hospital sample. Role ambiguity significantly impacted turnover intention in the specialized hospital sample without the mediating stress variable. This led Fang and Baba (1993) to conclude role stressors positively but indirectly influence turnover cognition through stress, which serves as a mediator.

LISREL was also used to test a rival model that included job satisfaction as a mediator between stress and turnover intentions. In both the general and specialty hospital samples, the AGFI of the rival model fell below the 0.90 level (0.875 and 0.851, respectively) indicating that the data did not fit the model. The AGFI returned to acceptable levels when the direct relationship between stress and turnover intention was restored in both data sets. Fang and Baba (1993) maintained that this phenomenon, along with no significant relationships between the attitudinal variables and the stress-turnover cognition path, supported their hypothesis that intention to quit was a direct consequence of job-related stress.

Stress in Allied Health Professionals

Rees (1995) conducted a thorough analysis of job-related stress among several healthcare disciplines and explored whether such stress had an adverse impact on the worker or the organization. The intent of the study was to assess occupational stress in

order to develop strategies for intervention. Rees asserted that his study was important because the incidence of stress among healthcare personnel has led to increased burnout, turnover, and absenteeism.

Questionnaires were distributed to 1,754 employees of the National Health Service (NHS) in the United Kingdom, of which 1,176 instruments were returned for a response rate of 67%. Respondents were classified into 64 distinct occupational groups, which were subsequently placed into larger clusters for better statistical analysis. These were (a) administrative and clerical staff (n = 129), (b) ancillary and maintenance staff (n = 65), (c) professions allied to medicine, including psychologists (n = 147), (d) ward-based nurses (n = 430), (e) community-based nurses (n = 115), and (f) doctors (n = 153). (The term *ward* originated in England and can be used interchangeably with the Americanized nursing *unit, floor*, *wing*, or *department.*) One hundred and thirty-seven responses were discarded as *unknown*, *management*, or *highly-skilled technician* or *scientist.*

The OSI was adopted by Rees (1995) to measure and analyze self-reported stress. As described previously, the OSI contained six scales and possessed adequate reliability measures. Furthermore, Rees declared that the OSI was valid for healthcare and *blue collar* laborers even though it was originally devised for *white collar* professions. Rees determined the incidence of sick leave during the previous 6 months and conducted a one-way analysis of variance to compare the six occupational classifications against the OSI instrument and absence data.

Rees (1995) found that ward nurses had higher scores in social support (X-BAR = 17.5) than other groups (R = 16.1 – 17.1). On the sources of pressure subscale, these

employees also measured higher on factors intrinsic to the job (X-BAR = 31.0, *R* [other] = 28.3 – 30.2) and management role (X-BAR = 38.3, R [other] = 33.2 – 37.9). These differences were significant at the $p<0.001$ level. Community-based nurses scored highest in the mental ill-health category (X-BAR = 54.3, *R* [other] = 49.1 – 53.9).

Other findings were noted as well. The professions allied to medicine appeared to have the more moderate of all group measures. Ward-based nurses, however, reported high measures of job satisfaction in terms of value, growth, and achievement. The physicians reported increased ratings of Type-A behavior and very high job satisfaction scores. Incidence of absenteeism from among the doctors was less than two days, while respondents in all other groups averaged almost five days.

Rees (1995) maintained that ill health among administrative and clerical workers was due to their having little control over their work and that interventions for management might include team-building techniques, job rotation, and job redesign. These would mitigate organizational structures within the NHS contributing to low job satisfaction among ancillary workers. The increases in job pressures reported by ward-based nurses could be addressed by management through flexible staffing, utilizing nurse extenders (licensed and non-licensed assistants), and team building. Most pressure was hypothesized to be based on cost reduction mandates. The same family of interventions was suggested for community-based nurses. Rees concluded that physicians who experienced occupational stress continued to work because it was difficult to find professional assistance. The cultural expectation towards doctors would have to turn before this changed.

This study by Rees (1995) was one of the few data-based examinations in the

literature that included disciplines outside of nursing. His findings show that all workers in the industry are subject to the effects of job-related stress and can benefit from organization-based interventions. The work of Ramirez, Graham, Richards, Cull, and Gregory (1996) is also important in this regard and consisted entirely of doctors.

Ramirez et al. (1996) studied 882 British physicians for occupational risk factors associated with poor mental health. Citing editorials that United Kingdom healthcare reforms led to increased job stress among medical professionals, they stated that the mental health of physicians was an ongoing concern. A questionnaire-based survey was used to measure burnout and psychiatric morbidity and analyze sources of job stress among the practitioners in the study. The effect of adequacy of training in relation to coping with job stress was also examined. Psychiatric morbidity was expressed in terms of "depression, loss of confidence and sleep disturbance" (p. 724). The researchers determined that job satisfaction had a positive impact on an individual's mental health and stress factors.

Survey packets were returned on 882 of 1,133 physicians (deemed *consultants*), for a 78% response rate. The sample included 241 gastroenterologists, 161 surgeons, 214 radiologists, and 266 oncologists. The General Health Questionnaire (GHQ) was employed to capture data regarding psychiatric morbidity. Ramirez et al. (1996) asserted that the 12-item instrument was reliable and accepted in occupational settings for measuring the desired attributes. A score of four or more indicated that psychiatric morbidity was likely. Syndromes of burnout were measured utilizing the MBI, described previously. Higher values in the emotional exhaustion and depersonalization sections, combined with lower scores on personal accomplishment scales, indicated that the

respondent is experiencing burnout. A third tool was developed by the researchers specifically for the study which captured data on global impressions of job stress and job satisfaction.

Ramirez et al. (1996) used a chi-square test, with Yates' correction, to estimate the influence of psychiatric morbidity and job burnout in relation to the perception of the participant's adequacy of training, to examine contributing stress factors across the various medical specialties, and to determine adequacy of training. Logistic regression analysis was used to determine the degree to which demographic characteristics, together with job stress and satisfaction factors, were associated with burnout and psychiatric morbidity.

Four sources of job stress were identified by the researchers: (a) work overload, (b) poor supervision and resource management, (c) the assumption of management responsibilities, and (d) dealing with patient suffering. The greatest contributor to job stress was work overload, or the perception of too much work being performed in the time allotted. Ramirez et al. (1996) likewise ascertained four sources of job satisfaction: (a) good relationships with patients, families, and staff; (b) intellectual stimulation; (c) professional status; and (d) good supervision and resource management. Maintaining good relationships contributed the most to job satisfaction. Those who felt that they had received the least training in numerous functional areas such as clinical skills, management, and communication reported greater stress and job dissatisfaction. Work overload was a function of inadequate training.

Ramirez et al. (1996) found that 26% of those surveyed had a GHQ score of four or more, suggesting some psychiatric morbidity. As a group the radiologists reported a

greater incidence of burnout and scored lower on the personal accomplishment subscale. Surgeons had the best scores for stress and satisfaction. According to regression analysis the traits of emotional fatigue, a feeling of being overwhelmed, and having to deal with suffering patients were related to GHQ and MBI scores representative of burnout and psychiatric morbidity at the $p<0.01$ level.

Job satisfaction protected the mental health status of physicians, according to Ramirez et al. (1996). Those who were satisfied with their work reported the least amount of stress. They found that surgeons are protected somewhat from burnout and dissatisfaction by the control they maintain over their schedule and positive feedback received from patients. Radiologists, who provide clinical support services, lack this control and seldom interact with patients over an extended period of time. Physicians who received adequate training were less likely to experience job stress and psychiatric morbidity.

A study by Frazer and Sechrist (1994) also examined occupational stress in the allied health professions. Their investigation was even more unique in that it excluded nurses and physicians. The researchers sought to identify and relate occupational stressors among medical (laboratory) technologists, radiologic technologists, and nuclear medicine technologists in terms of job performance. They believed that allied health professionals, like their nursing counterparts, are expected to perform *error-free*, which leads to increased stress and diminished job satisfaction. The top five stressors in each discipline were compared and analyzed in anticipation of identifying strategies for prevention and treatment.

Of the 959 radiologic technologists selected from the 1989 *American Registry of*

Radiologic Technologists, 198 (20.6%) responded. Likewise, 900 medical technologists were chosen from the American Society of Medical Technologists, of which 322 (35.8%) participated. The researchers stated that 63 usable responses were gleaned from among 300 nuclear medicine technologists randomly selected from the *Directory of Certified Nuclear Medicine Technologist*, for a 21% response rate.

Frazer and Sechrist (1994) used a modified version of the Delphi technique to obtain 35 primary occupational stressors for the three disciplines. The 35 stressors identified for the radiologic technologists and medical technologists were generated with the input of 100 randomly selected participants from each profession. For the nuclear medicine technologists, the writers interviewed 25 randomly selected individuals. Following this professional consensus phase, the healthcare association directories described above were consulted to randomly select individuals to rate each of the 35 stressors in their profession.

A technique known as *magnitude estimation* was used during which participants were asked to rate each stressor on a scale of 0 to 1,000 as compared to their perception of a median stressor. As explained by Frazer and Sechrist (1994):

> A respondent would rate a stressor between 501 and 1,000 if the item was more stressful than the median stressor, 1-499 if the item was less stressful than the median stressor, 500 if the item was equally stressful, and 0 if the item did not stress the respondent. (p. 55)

The researchers reported that the reliability estimates of this method ranged from 0.82 to 0.96.

Radiologic technologists reported their top five stressors as (a) disrespectful physicians, (b) inadequate pay, (c) unnecessary examinations, (d) lack of staff, and (e)

lack of respect. The medical technology group ranked their leading stressors as (a) equipment breakdowns, (b) poor management practices, (c) difficult coworkers, (d) lack of time, and (e) exposure to the human immunodeficiency virus (HIV). Nuclear medicine technologists identified their top five stressors as (a) equipment malfunctions, (b) add-on examinations, (c) uncooperative physicians, (d) lack of staff, and (e) uncooperative patients.

Frazer and Sechrist (1994) grouped the top ten stressors among the three disciplines into five categories. These were (a) work content, (b) work organization, (c) responsibility, (d) role conflict, and (e) career development. Analysis of variance showed a significant difference between the top ten stressors by category. Significant differences were also determined between the subgroups of radiologic technologists and nuclear medicine technologists (F Ratio = 8.382; $df = 2, 27$; $p < .01$), and also between radiologic technologists and medical technologists (F Ratio = 8.914; $df = 2, 27$; $p < .01$). The stressors relating to work organization and work content accounted for 69% of all stressors listed. Workload and exposure to HIV or acquired immunodeficiency disease (AIDS) appeared on more than one list. Lack of staff appeared on all three.

The investigators concluded that the occupational stressors identified in this study centered around communication and perception. They suggested that healthcare administrators evaluate the effectiveness of organizational communication, the perception and support of fellow-workers, and managerial style in order to reduce occupational stress and attract and retain qualified technologists. Frazer and Sechrist (1994) contended that the stressors identified in their study could be addressed within the *corporate culture* (p. 64).

Stress Related to Exposure to HIV and AIDS

Despite advanced understanding and medical management of HIV and AIDS, some healthcare personnel report continued apprehension with providing care to infected persons. Gueritault-Chavin et al. (2000) examined the effects of occupational stress associated with caring for patients infected with HIV and AIDS. Organizations such as hospitals have established standard precautions for patient care, in accordance with recommendations from the Centers for Disease Control and Prevention. Using standard precautions with all patients (such as wearing gloves and other protective devices depending on the procedure being performed) significantly reduces the likelihood of accidental exposure to infection, including HIV and AIDS. In this study the researchers employed the interchangeability of stress and burnout constructs.

Gueritault-Chavin et al. (2000) mailed survey packets to 1,500 randomly selected members of the Association of Nurses in AIDS Care. Of these, 523 were returned for a 35% response rate. A total of 455 participants were ultimately retained for the analysis. Males accounted for 16% of those responding, with an average age of 43.9 years. Specific to this study, the average number of AIDS patients respondents had treated in the last three months was 123, and three patients had died while under their care.

Burnout was measured using the MBI, as described above. The internal consistency coefficient was reported as 0.88. The 29-item Internal-External Locus of Control (I-ELC) scale was utilized to assess the respondent's belief about whether environmental events were the result of internal or external causes. The internal consistency measure of the I-ELC was 0.74. The Revised Ways of Coping scale is a 33-item instrument used to measure emotion-focused (external) or problem-focused

(internal) coping responses to stressful situations. Perceptions of workload were reported as light, medium, heavy, and very heavy.

Not surprisingly, Gueritault-Chavin et al. (2000) found the strongest correlations between total MBI scores and its respective subscales. Mild but significant associations between perceptions of workload and total MBI scores ($r = 0.244$) and between workload and the emotional exhaustion subscale of the MBI ($r = 0.346$) were also determined. As a predictor of burnout, workload accounted for 5.6% of the variance using hierarchical multiple regression, which was statistically significant. As age, internal locus of control, external locus of control, external coping strategies, and internal coping style were added to the model, each was statistically significant with respect to predicting burnout.

Based on these results, Gueritault-Chavin et al. (2000) concluded that workload is positively (although not strongly) correlated and significantly predictive of burnout among nurses providing care to patients with AIDS. They stated that internal coping was the best resource in fighting burnout. They recommended that training programs be established by healthcare providers to improve internal coping skills.

Gueritault-Chavin et al. (2000) inexplicably placed nurses with religious beliefs, expressed through concepts such as faith and prayers, in their description of the external coping category, together with those classified as exhibiting denial and fatalistic or pessimistic attitudes. They stated that such external coping led to higher levels of burnout among AIDS caregivers. While the relationship between the two was statistically significant ($p = 0.01$), it was moderate at best ($r = 0.422$).

Montgomery and Lewis (1995) conceptualized fear of HIV contagion as workplace stress in their study of top officials at 558 of 5,191 hospitals registered with

the American Hospital Association. The 558 represented a 78% response rate from the 716 that were sampled. The researchers applied their fear-as-stress approach to interviews with senior executives and senior nursing executives at participating hospitals.

The director of nursing was deemed the *most appropriate spokesperson* for the hospital in terms of observable nursing behavior (Montgomery & Lewis, 1995, p. 444). The administrator was interviewed regarding HIV policies and organizational structure. Fear of contagion was assessed by the extent to which the director of nursing was aware of expressed fears of contagion and the proportion of nurses who had reported such fears. From this, Montgomery and Lewis classified participating hospitals as high fear or low fear.

Approximately 35% of nursing directors in the study reported that all or most nurses expressed fears of HIV infection. About one third of the hospitals surveyed were deemed *high fear*. A relationship was found between high fear hospitals and moderate or extreme actions on behalf of nurses to avoid contact with HIV-infected patients, such as excessive protective clothing to refusal to provide care to resignation. Nursing directors reported that staff had resigned or requested transfers in lieu of caring for HIV infected patients in about 9% of participating hospitals.

The study supported the researchers' hypothesis that fears related to HIV exposure could be expressed as occupational stress and could result in negative outcomes for the organization and the patient. Montgomery and Lewis (1995) surmised that "One of the most difficult employee responses that managers must cope with is fear" (p. 440).

Niven and Knussen (1999) investigated the psychometric properties of an HIV and AIDS stress inventory, designed for patient care personnel. A lack of knowledge

about HIV and AIDS, uneasiness over treating people known to have it, and workload were salient factors determined by the analysis. In general, a lack of knowledge was associated with negative attitudes regarding HIV and AIDS.

The researchers issued survey packets to 340 workers in a Scottish health authority. Of these, 174 participated for a 51% response rate. After removing 34 due to no contact with AIDS patients during the previous year, the final sample consisted of 140 caregivers. These included 57 general nurses, 13 auxiliary nurses, 16 midwives and family planning nurses, 10 clinical nurse specialists, 11 physicians, 18 allied health professionals (such as social workers, radiologic technologists, and occupational therapists), and 15 clerical workers.

The proportion of females responding was 86% and the mean age was 37 years. The average length of time in the position was 5 years. Those who had received formal training relating to HIV and AIDS patients represented 64% of the sample.

Niven and Knussen (1999) utilized the 8-item AIDS-stress scale (AIDS-SS) to assess occupational stress related to caring for AIDS patients. The AIDS-contact scale measured total physical and social contact with AIDS patients in the previous 12 months. The AIDS-phobia scale contained a single item related to attitudes towards people with HIV and AIDS.

The 57-item Eysenck Personality Inventory assessed extraversion and neuroticism. The GHQ (specifically, the GHQ-28) assessed symptoms of distress in the somatic, insomnia, social dysfunction, and depression domains. Social desirability was measured using the Marlowe-Crowne Social Desirability Scale.

Niven and Knussen (1999) assessed a number of dimensions during interviews

with the participants. These included (a) working with patients of unknown HIV status, (b) treating clients who use drugs, (c) working with homosexual patients, (d) dealing with relatives of those with HIV and AIDS, (e) dealing with frustrations associated with helping HIV and AIDS patients, (f) dealing with the death of young people from HIV and AIDS, and (g) dealing with concerns about a lack of training related to HIV and AIDS patients.

After completing some of the survey instruments, respondents were then contacted for a face-to-face interview. Then the respondents were given more scales to complete so the researchers could compile the data. Following the analysis of some descriptive statistics, principal components analysis was used to determine what factors of the AIDS-SS were related.

Treating patients with HIV and AIDS was one of the most stressful parts of the job, according to 41% of respondents. Eighteen percent (18%) reported they were concerned about the risks of contracting HIV and AIDS as a result of their work. Fourteen percent (14%) were *not at all* comfortable with treating HIV and AIDS patients. A significant negative correlation was determined between lack of knowledge scores and social contact scores ($r = -0.34$). No significant relationships were found between workload scores and attitude or training dimensions.

Niven and Knussen (1999) used both principal components and principal factor analyses for extraction. As described in Chapter 4, extraction refers to the initial reduction of a covariance matrix into a smaller number of components or factors. Both orthogonal and oblique rotation techniques were used. Since these procedures yielded similar results, principal components analysis with varimax rotation was preferred.

Three factors were determined for the AIDS-SS by Niven and Knussen (1999). The first factor, accounting for 40% of the variance in the model, was labeled *lack of knowledge* and included three items related to the respondents' confidence in their knowledge to treat the physical, emotional, and family support needs of HIV and AIDS patients. The eigenvalue of the first factor was 2.81 and the reliability coefficient was 0.84.

The second factor was *discomfort*, and this accounted for 23% of the explained variance. This two-item component measured the comfort expressed by respondents regarding the treatment of HIV and AIDS patients and dealing with their families. The reliability coefficient of the discomfort factor was 0.84 with a corresponding eigenvalue of 1.59.

The third subscale was *workload*. This two-item factor was related to the stress of working with HIV and AIDS patients and the difficulty of dealing with such clients in the future. Workload accounted for 18% of the variance of the observed variables, and the eigenvalue was 1.24. A reliability coefficient of 0.72 was reported for the third factor.

On the three factors, Niven and Knussen (1999) found lack of knowledge scores significantly related to negative attitudes of HIV or AIDS patients ($r = 0.28$). No significant relationships were found between attitudinal factors or training concerns and workload. It should be noted that the AIDS-SS was not cited in the other stress literature pertaining to RNs or allied healthcare professionals.

Stress Due to Mergers, Acquisitions, Divestitures, and Job Redesign

The 1980s and 1990s were characterized by mergers, acquisitions, and divestiture

of facilities among healthcare providers, leaving stressed survivors of reorganization in their wake. Increased bureaucracy and documentation created by managed care, accreditation renewals, and similar activities important to reimbursement have led to nurses and allied health professionals spending increasingly more time charting and less time doing those things their license permits them to do--care for the patient.

Mesch et al. (1999) examined the effect of job loss due to facility closure on mental health workers in Indiana. Downsizing due to acquisition, merger, and divestiture of facilities is not new to healthcare. In the last two decades, however, the development of multihospital systems through which economies of scale could be attained from coordinated purchasing power and contract negotiations has led to the consolidation of many entities, including former competitors.

Interviews were conducted with 124 of 172 eligible respondents before the closure of Central State Hospital (CSH), for a 72% participation rate. Workers either transferred to another facility within the state mental health system, Larue Carter Hospital, or otherwise left the system for other opportunities. Of the 124 who participated in the first wave, 85 participated in a second wave of interviews eight months after closure. The 85 included 39 employees who transferred to the other hospital and 46 who left the system. The percentage of females was 56% and the average age was 46 years. The mean number of years employed at CSH was 12.

Mesch et al. (1999) developed the Attitudes Toward Closure (ATC) scale and the Attitudes Toward the Mentally Ill (ATMI) scale for the investigation. A Cronbach's alpha coefficient of 0.82 was reported for the ATC and 0.63 for the ATMI. When the post-closure surveys were completed, the Pearson product-moment correlation coefficient

between the two waves was 0.54.

Life stress was assessed using the Indianapolis Network Mental Health Study-Staff Questionnaire. This scale had a Cronbach's alpha coefficient of 0.90 and a single-item measure of job-related stress was added. Coping was measured using the Billings and Moos Coping Inventory (BMCI). Reliability measures for the subscales of the BMCI ranged from 0.63 to 0.78. Depression was assessed using the Center for Epidemiologic Studies-Depressed Mood Scale (CES-D) containing a Cronbach's alpha coefficient of 0.89.

Work conflict was measured using a scale adapted from the Community Program Philosophy Scale (CPPS), developed in 1991. A corresponding Cronbach's alpha coefficient of 0.90 was reported for the CPPS. Other measures for the study included procedural justice (fairness), work satisfaction, health limitations, healthcare utilization, employment history, and the respondent's hopes for the future.

Mesch et al. (1999) found that, in general, worker attitudes towards closure were more positive after the 8-month period had elapsed. The short-term effect of impending closure left people rather stressed on the job (mean score = 2.7 on a scale of 1 to 4), but as they went through the experience and found other opportunities, the long-term effect was not as daunting (mean score 2.4). Also decreased were scores on depression, procedural justice, and general life stress. What did increase by the second wave was work conflict (from 2.11 to 2.34, on a 1 to 4 scale). It was concluded that the 85 respondents were having difficulty adjusting to their new work culture, if employed elsewhere. Those who transferred to the other state hospital reported decreased stress levels despite experiencing more conflict and job dissatisfaction.

It may be that the displaced workers who ended up at Carter Larue Hospital found the new setting stable and predictable, whereas their previous employer was in significant turmoil due to the impending closure. Therefore, when comparing stress levels the lower scores at the newer facility would be expected, even with higher conflict and less job satisfaction scores. The implication for managers is that employees will experience increased stress levels if terminations or forced transfers are the result of mergers, acquisition, or divestiture. The good news for employees is that, once employed in an alternative environment (assuming comparable pay, benefits, and other conditions of employment), stress levels should decrease due to the employees being removed from the chaos from the previous environment.

Maurier and Northcott (2000) studied the effects of job stress on depression and physical health related to healthcare restructuring in Canada. Using the transactional model of stress advanced by Lazarus and Folkman (1984), the researchers considered whether individual coping skills would alleviate the anxiety related to job uncertainty. Their study was conducted during budget reductions and rumors of layoffs at an Edmonton, Alberta, facility.

Survey instruments were returned by 271 of 1,000 registered nurses sampled in the study, for a 27% response rate. Occupational stress was assessed using a scale adapted from a 1979 master's thesis and demonstrated a Cronbach's alpha coefficient of 0.85 for reliability. Measures of physical health were collected using a modified scale developed in 1988. The reliability coefficient for physical health scale was 0.79. The CES-D, described in the previous study, assessed various symptoms associated with depression, mood, and fear and had a reliability measure of 0.93. Primary appraisal was

determined by using a 12-item scale developed by Lazarus and Folkman (1984). Their Ways of Coping (WOC) questionnaire was also administered. The primary appraisal instrument demonstrated a Cronbach's alpha coefficient of 0.90, whereas the reliability measures of the WOC subscales ranged from 0.57 to 0.66.

Maurier and Northcott (2000) found the nurses in their study to have a moderately high stress level (3.3 on a 5.0 scale). Respondents reported the most significant workplace stressor was their potential job loss. They also reported management plans to replace them nurses with unlicensed nursing assistants and their inability to satisfy physicians and coworkers as significant sources of stress.

Hierarchical regression analysis was employed by Maurier and Northcott (2000) to investigate the effects of job uncertainty, working conditions, cognitive appraisal, and coping strategies on depression. Nearly 16% of the variance in depression was explained in step one, in which the dependent variable was regressed on job uncertainty. When physical conditions were entered into the model at step two, they were significantly related to depression and added more than 5% to the variance. Cognitive appraisal, described in detail below, added more than 11% to the variance explained in depression to the third step. In the last step, coping strategies added nearly 9% to the explained variance in the model. The coping strategies of escape-avoidance, planful problem solving, and positive reappraisal were significantly related to depression.

The same independent variables were then regressed on physical health with similar results. Overall, the model explained 31.3% of the variance in physical symptoms. Of interest was step four, in which the coping strategy of planful problem solving was significantly related to poor physical health (r = - 0.397). This surprised Maurier and

Northcott (2000), who maintained that the transactional theory of stress would suggest otherwise.

Schommer (2001) discussed the effect of work redesign on pharmacists. In particular, time management techniques were hypothesized to alleviate job-related stress. Data for the study were collected by the Midwest Pharmacy Workforce Research Consortium in 1999 and 2000, and jointly by the University of Minnesota and University of Ohio in 1999. Hospital-based pharmacists were compared to practitioners in other settings, such as retail drug stores.

Workload characteristics under investigation by Schommer (2001) included hours worked per week, the time a pharmacist spent as the only licensed practitioner in the department, the number of prescriptions filled by the pharmacist, and interactions with others during a typical workday. Hospital pharmacists reported an average of 76 interactions during a typical day. These included 9 face-to-face encounters with patients and 18 such encounters with non-patients, such as nurses or physicians. Six patient encounters were reported by other methods, such as by telephone or facsimile, and 43 similar episodes with non-patients.

Pharmacists in community settings (retail) reported an average of 141 interpersonal interactions, the majority reported for any category. Of these, 59 (42%) were patient encounters and 82 (58%) were with others. For the patient group, community pharmacists averaged 56 (40%) face-to-face encounters. Professionals in other pharmacy settings, such as clinics and nursing homes, had a mean interaction rate of 99 per day. Of these, 38 (38%) were with patients. Face-to-face encounters with patients averaged 27 (27%).

Schommer (2001) identified examples of environmental stressors as psychological demands, time pressures, and noise. Organizational stressors included decision-making responsibility, role ambiguity, and role conflict. The researcher listed job climate stressors as company politics, communication systems, and organizational change. Interpersonal stressors included relationships with supervisors, peers, and subordinates.

Given the workload characteristics of the typical pharmacist, especially the number of interpersonal interactions encountered in a day, Schommer (2001) postulated that time management techniques could be used to overcome the stressful situations listed. This would be accomplished through job redesign. Following a situational assessment, incremental changes to work duties can be made with input from various stakeholders. A cost-benefit analysis of the job redesign idea should then occur next.

Classical time management ideas were provided by Schommer (2001). These included prioritizing tasks, learning how to say *no* to certain requests, and avoiding time wasters. Some items may seem very urgent, but they are not important. On the other hand, some tasks are extremely important, but because a patient or physician is not waiting at that moment, they do not seem as urgent. Classifying daily tasks by important and urgent, important but not urgent, not important and urgent, and not important and not urgent is a priority setting strategy. Minimizing time wasters included ideas such as setting limits on conversations and delegating paperwork tasks to trusted peers who do not need a pharmacist's license to complete forms.

Schommer (2001) stated that pharmacies are stressful environments, even in the presence of good time management techniques. Exercise, hobbies, and good sleep habits

were suggested as ways to pace oneself in managing stress. Job redesign would lead to improvements in efficiency and effectiveness resulting in improved stress levels and workloads for today's licensed practitioners.

Stress and Social Support or Group Affiliation

Social support, group affiliation, and the home-family interface are important aspects of occupational stress. Eleven of the research studies cited in this work included data on the role of supportive relationships in the stress coping process. The significance of social support dimensions vary, depending on the study and its focus, but the importance of friends and family in mitigating the effects of stress continue to be of interest to researchers.

For example, the work of Evers et al. (2000) led to an expanded measure of social support on their updated Dutch version of the OSI, described previously. The researchers, including Cooper who created the original instrument, cited difficulties with reliabilities on certain factors of the OSI. Researchers using the OSI typically have reported the composite scores to deal with the low reliability coefficients of the subscales. They felt that important information was not collected because of this, so new subscales were created for the Dutch instrument.

Participants included hospital nurses working in The Netherlands. Of the 553 nurses sampled, 400 questionnaires were returned for a 72% response rate. The average age was 34 years, and 80% were females. Participants also included 310 soldiers in the Dutch army, 184 street car drivers, and 126 police officers.

In reconsidering the coping subscale of the OSI, Evers et al. (2000) consulted the literature and developed eight dimensions of coping they considered to be most relevant,

including emotional and instrumental support. They cited the work of Lazarus and Folkman (1984) among others in this regard. Moderate to high correlations were found between instrumental social support and active coping ($r = 0.56$) and emotional social support and active coping ($r = 0.51$). Instrumental support includes tangible encouragement such as transportation, baby sitting, domestic duties, and financial assistance.

Evers et al. (2000) found that a four-factor solution was the most appropriate for interpretation. Included was a factor specified as social support and included the instrumental and emotional support dimensions. For the nurses in their sample, social support was an important aspect of the individual's ability to cope with stress.

In their trade journals, practitioners are also reading about the positive effects of belonging to social groups in dealing with occupational stress. Citing the *experts*, Vernarec (2001) stated that the best way to address stress is for nurses to either change their environment or their response to the stressful situation. "Our degree of social support" is of particular importance in taking control of workplace pressures, stated Vernarec (p. 45).

Group membership in the context of religious affiliation was studied by Neumann and Chi (1998). The effects of paternal spiritual beliefs and attendance at religious services on the well being of adult children were examined. It was hypothesized that those whose religious values were similar to their father's and whose fathers attended church on a frequent basis would have lower risk factors CHD and better psychological health.

Neumann and Chi (1998) chose a sample size of 50 persons residing in

Tennessee, of which 16 were female. The mean age for females was 57 years and for males it was 39 years. Blood samples were taken to investigate a number of physiological dimensions, including a propensity for CHD.

Psychological assessments were numerous and included a 13-item unpublished stress scale, originating from a dissertation. Anxiety was measured using the State-Trait Anxiety Inventory (STAI) and depression was assessed using the Beck Depression Inventory. The State-Trait Anger Expression Inventory captured data on anger, and forgiveness was assessed using the Forgiveness Scale. Hostility was measured by utilizing factor-analyzed items from the Minnesota Multiphasic Personality Inventory (MMPI) and social desirability was assessed using the Crowne-Marlow Social Desirability Scale (CMSDS), developed in 1960. The Coping Inventory for Stressful Situations measured coping style. No reliability coefficients were reported for any of the instruments and, unless otherwise stated above, no publication dates were provided.

Neumann and Chi (1998) chose to look at father comparisons for their study. Participants were asked if their father held similar religious views and the frequency with which he attended church, if applicable, when the respondent was a child. The variable *father attend frequently* described those whose fathers attended religious services on a regular basis, as perceived by the respondent. *Father similar* meant that the father had held religious views similar to those of the respondent.

Respondents whose fathers attended religious services regularly and held similar viewpoints were found to be generally in better mental and physical health than the others. The *father attend frequently* group reported improved task coping, emotional coping, state anxiety, trait anxiety, hostility, aggression, anger, and forgiveness scores

than their *father attend infrequently* counterparts. Lower risks of CHD were also observed for this group, based on physiological outcomes. Additionally, the *father similar* group reported better exercise habits and less tobacco use.

In a study by Rietschlin (1998), the effect of voluntary association membership on psychological distress was examined. He postulated that group interactions through voluntary affiliations would diminish the stress effect experienced by members. Data were collected on 850 people who participated in a 1984 community survey in western Ontario. Women accounted for 54.5% of the sample, with a mean age of 58.6 years.

Stress was measured using the 31-item Application of Events Checklist. Additional stress measures were added to capture data on financial difficulty and family strain. Cronbach's alpha coefficients for the stress instruments ranged from 0.79 to 0.81. The 20-item CES-D captured dimensions of depression which was used to operationalize distress. The reliability coefficient for the CES-D was 0.86.

Psychological and social resources were measured by the Rosenberg Self-Esteem Scale (Cronbach's alpha = 0.78) and a self-efficacy scale (Cronbach's alpha = 0.72). Social support was assessed using two scales from the early 1980s with reliability measures of 0.75 and 0.78. Voluntary association membership and frequency of attendance at religious observances were also measured. Examples of association membership were church-related, recreational, fraternal, and civic organizations.

Rietschlin (1998) found equal dispersion among voluntary group membership status. Approximately 25% reported no group membership, and 25% each belonged to one group, two groups, and three or more groups. He also found that 25% of those participating in the study never attended religious services, while 35% attended weekly,

and the remainder fell between these two categories.

Hierarchical regression analysis was used to examine the relationship between psychological distress and voluntary associations. The first step indicated a small (unstandardized, b = - 0.33) but statistically significant relationship between distress and group membership. Stress was added to the second step, resulting in little change in the distress coefficient but increasing the amount of predicted variance in distress (R^2) from 0.54 to 0.146. The third model added an interaction term between stress and voluntary association. A small but negative and statistically significant (b = -0.162) coefficient provided evidence that the stress decreases as group memberships increase. The increase in explained variance was minimal.

The fourth sequence added social support variables to the model, reducing the stress coefficient by half and nearly doubling the amount of explained variance in distress from 0.156 to 0.307. Rietschlin (1998) found this to be evidence that stress was mediated by mastery, self-efficacy, and social support. He concluded that religious affiliation could affect an individual's perception of stressful events and that other types of group affiliation have similar results.

Stress and Workplace Violence

Duhart (2001) reported that 69,500 nurses were victims of workplace violence between 1992 and 1996. According to the Department of Justice study, this equaled 22 workers per 1,000. The incidence of violent crimes against nurses was 50% higher than those in other health occupations.

O'Connell, Young, Brooks, Hutchings, and Lofthouse (2000) found that workplace violence led to burnout in a study of 400 nurses in an Australian teaching

hospital. The respondents were employed on general *wards*, meaning they were not assigned to emergency or mental health units where the incidence of aggressive behavior was hypothesized to be skewed. Females accounted for 93% of those responding, and 70.2% were between the ages of 20 and 39 years. Aggression included verbal abuse, physical aggression, and intimidation.

During the previous 12-month period, 80% of those responding had experienced physical aggression. Of these, more than half reported being punched, pushed, grabbed, and scratched between one and four times annually. Verbal aggression was reported by 95% of those responding. Patients were the most frequent sources of physical aggression (53%) and verbal abuse (83.7%). However, physicians, peers, and other hospital employees had also engaged in abusive activity against the nurses responding.

Emotional responses to violent behavior included frustration, anger, and fear. After experiencing an act of aggression, 53% reported feeling burned out on the job, while 20% requested sick leave benefits. Another 20% resorted to alcohol or drug use in response to such occurrences.

Sheehan (2000) provided some suggestions for defending staff against potentially violent situations. These included (a) providing annual staff education on violence prevention and de-escalation techniques; (b) establishing a rapid response team who can be paged when a hostile situation intensifies; and (c) developing a zero tolerance policy on workplace violence and intimidation. Sheehan stated that violence was often caused by inappropriate reactions to anxiety and fear by patients and family members.

Violence as a factor in recruitment and retention was discussed by Jackson, Clare, and Mannix (2002). They found that violence took many forms such as bullying, sexual

harassment, and assault. *Bullying* was described as an occupational stressor that included threats, ridicule, harassment (non-sexual), misuse of power, excessive criticism, and excluding the victim from information sharing. The stress outcome associated with bullying included insomnia, demoralization, and eventually turnover. Sexual harassment as a form of intimidation and occupational stress is described below.

Given declining enrollments in nursing and allied health education programs, the implications of violence for recruitment are serious. Employees want to feel safe on the job and be assured that the organization has a good reputation for protecting its staff. Likewise, healthcare providers have a responsibility to educate their workforce about aggressive behavior, especially its prevention, and to manage it effectively should it occur.

Stress and Sexual Harassment

Daugherty, Baldwin, and Rowley (1998) examined the experiences of second year medical residents. One dimension of their investigation was perceptions of mistreatment, which included any incidence of sexual harassment. Participants were 1,277 second-year residents who were randomly selected from the 1991 *American Medical Association* membership directory. Of these, 30% reported having been the recipient of sexual harassment during their residency.

According to 63% of the females, sexual harassment occurred on a frequent basis. Fifteen percent (15%) of the males made this assertion. Daugherty et al. (1998) stated that the majority of sexual harassment was manifested through sexual slurs and innuendos, followed by unwelcome sexual advances. The incidence of *quid pro quo* sexual harassment—sexual favors in return for benefits, pay, or promotion—was very rare.

The 1998 study reported data from 1991, the same year in which senate confirmation hearings regarding United States Supreme Court nominee Clarence Thomas occurred. During those proceedings former staff member Anita Hill alleged Thomas had engaged in sexual harassment. Perhaps medical residents in the year that followed his confirmation would have indicated higher levels of sexual harassment than those reported.

Keyton and Rhodes (1999) collected data on sexual harassment from 432 men and women. These included 211 university workers and 221 state government employees in the southern United States. Of the university personnel, 110 were female (52.1%), as were 109 of the government workers (49.3%). Training strategies effective for managing sexual harassment in the workplace were discussed. These were as follows:

1. Training should include material about both verbal and nonverbal harassment.
2. Information about sexual harassment should be included in a new employee orientation to the organization.
3. Employees should be instructed to avoid engaging in sexual harassment and how to avoid becoming a victim.
4. Training regarding what constitutes appropriate and inappropriate workplace behavior should be provided.
5. Roleplay should be used as an effective training technique for sexual harassment prevention.

A longitudinal study of 216 women at a Midwestern university was conducted by Munson, Hulin, and Drasgow (2000). Data were collected in 1994 and 1996; the 216 participated in both surveys. The sample included females in teaching and secretarial roles, as well as participants from engineering and other areas they hypothesized to be male dominated.

Compared to what the literature review had indicated, Munson et al. (2000) found rather low levels of sexual harassment. Nonetheless, they found that the respondents did not endorse inappropriate conduct of a sexual nature on the job. What little sexual harassment did occur was perceived to be gender-based. That is, the females reported that males were the initiators of the misconduct.

Bingham and Scherer (2001) investigated the effects of a training program on sexual harassment, on participants' knowledge of policy, perceptions about sexual harassment, on their willingness to report it, and on attitudinal factors. Participants were 530 employees of a large university in the Midwest. Females accounted for 281 of the respondents (53%).

Knowledge about sexual harassment involved the participants' awareness of existing policies and their understanding of the prescribed reporting mechanism. Conflicting opinions about what constituted sexual harassment were observed. For example, some respondents maintained that leering at someone's body was a form of sexual harassment, while others dismissed it as rudeness. Willingness to report sexual harassment was a measure of the participant's propensity to notify the appropriate officials if the behavior occurred. Attitudes about sexual harassment included dimensions such as whether a female who flirted with males or wore *sexy* clothing should be blamed if she reported sexual harassment or whether harassment had occurred if a male told a sexual joke in front of both males and females.

Bingham and Scherer (2001) found that participation in the sexual harassment training program was positively associated with the knowledge the individual had about sexual harassment and the university's policy. Even women who did not attend had a

moderate amount of knowledge about policies and procedures, indicative of general public awareness and an emphasis on sexual harassment following the Supreme Court confirmation hearings of Thomas.

Attendance was also associated with the respondent's lack of endorsement of inappropriate behavior in the work place. Those who participated did not endorse inappropriate conduct. For the males, there was little association between participation in the training and what kind of activities or behaviors constituted sexual harassment. Bingham and Scherer (2001) thought this to be an unusual finding. Apparently, those who attended did not condone sexual harassment, but they were not significantly different from males who did not receive the training when it came to identifying what behaviors constituted harassment. Attendance at training was associated with gender when it came to identifying what was appropriate and inappropriate behavior. It was important for management to be visible and set policy.

Davidhizer, Erdel, and Dowd (1998) described sexual harassment as unwelcome sexual advances or conduct, establishment of working conditions that condoned the same, requests for sexual favors, or a similar environment that unreasonably interferes with a person's ability to do his or her job. They described *verbal harassment* as dirty jokes and sexual innuendo. *Nonverbal harassment* included obscene gestures and staring at body parts, while *physical harassment* was comprised of inappropriate touching, embracing or pinching.

Davidhizer et al. (1998) suggested that nurse managers increase staff awareness regarding sexual harassment through information and education. Leaders should be role models in taking the issue seriously, and employees should be encouraged to report

sexual harassment in the event it occurs.

Decker (1997) drew a relationship between sexual harassment and productivity. He hypothesized that the incidence of sexual harassment was influenced by the convergence of four factors. These were (a) organizational response—the degree to which the hospital responded to sexual harassment in general, and prevailing attitudes; (b) social behavior—the types of socialization that occurred between staff, e.g., dating, flirting, and sharing of sexual exploits; (c) situational factors—the extent to which people worked in close proximity for extended periods of time, whether this was at night or day, and whether there were witnesses around; and (d) political factors—the extent to which physicians were allowed to engage in sexual harassment without concern of intervention by management or medical staff leaders.

According to Decker (1997), the following were important to a successful sexual harassment management strategy:

1. Create a work environment that monitors and prevents sexual harassment.
2. Establish a sound policy and reporting mechanism.
3. Provide prompt intervention when sexual harassment is reported.
4. Ensure that organizational response is clear, consistent, and supported.
5. Educate staff about sexual harassment.

Stress and Accreditation or Regulatory Complexity

Employees working in hospitals accredited by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) face additional pressure to comply with a complex set of standards. The U. S. Medicare and Medicaid programs, primary sources of hospital revenues, are administered by the federal Centers for Medicare and

Medicaid Services (CMS), formerly known as the Health Care Financing Administration. The Joint Commission on Accreditation of Healthcare Organizations has deemed status with CMS, meaning that the latter accepts accreditation by the former as having met its standards of management. JCAHO-approved hospitals place a major emphasis on accreditation. As verified by Austin (2000), a failed inspection can mean exclusion from Medicare and Medicaid.

The JCAHO accreditation survey can take from 3 to 5 days to complete, depending on the size of the hospital. In recent years the JCAHO has implemented unscheduled accreditation surveys, requiring most hospitals to be in a constant state of readiness. Accreditation requirements mean that healthcare providers must repeatedly engage in ongoing education regarding how to clinically apply restraint devices, provide care to various age categories of patients, and administer medication. This has created a source of stress for nurses and other allied health personnel.

Nettleman (1995) referred to the act of survey participation as *survival*. She advocated a proactive approach to survey readiness, including the scheduling of mock surveys and the training of medical staff members regarding recent revisions to standards, which are published each calendar year. Likewise, Firely and Walter (2002) created a game called *Survivor* to educate staff on how to endure the myriad of JCAHO requirements, referring to the survey as "one of the biggest stresses in our careers" (p. 33).

Using creativity and learning activities to deal with this survival mentality was also the subject of a report by Meyer, Siegel, and Olson (1996). Various instructional games and fun approaches to training were advocated. "This is especially helpful in

reducing the anxiety associated with preparation for a [JCAHO] survey," they stated (p. 42).

Perhaps this phenomenon was best summed up in the title of an article written by Malila and Kotal (1993): "Taking the Fear Out of the JCAHO Survey." They stressed the importance of planning ahead and constant focus on accreditation requirements, as opposed to gearing up for a scheduled survey when it was about 6 months away. They acknowledged that the constant development of new or revised standards by the JCAHO had *produced anxiety* in nursing personnel (p. 243).

Stress and Information Systems

Nurses and allied health providers constantly use computerized information systems to update patient information regarding the medical record, charges for procedures and supplies, and documentation of patient outcomes. More time in front of the computer and less time doing those patient care tasks permitted by the worker's license and training is a source of job stress. This is compounded when inadequate technology and unstable operating systems create additional frustration during the workday.

Allen (2000) declared that improving information systems was a clear challenge for the healthcare industry. She saw computerization within the industry as lagging behind other fields. The professions within healthcare need to push for better systems that will assist the worker to meet documentation demands without spending an entire shift in front of a monitor and keyboard.

Stiles (1994) found that a number of stressors were linked to computer usage. Psychosocial stressors included less decision latitude, additional psychological strain, and

physical complaints. Technology can dehumanize the workplace in certain circumstances, replacing decision-making and autonomy with the rote if-then outcomes of software programs. Some employees express feelings of alienation from the customer, in this case the patient, as more time at the computer is required. Cumulative trauma disorders of the upper extremities, arising from excessive or improper use of a keyboard, has been one of the most documented outcomes of ergonomic data in recent years (Hargreaves, 2002; Schneider, 2001).

Stress and Shift Work

Those working in health occupations often provide care at times that are outside of a *normal* or customary work schedule. People become ill or injured during the evening, middle of the night, and on weekends and holidays. These require the services of nurses, pharmacists, and radiologic technologists, as well as other members of the healthcare team.

Two aspects of shift work were reviewed for the present study. First, persons experiencing occupational stress may complain of unsatisfactory sleep patterns (Brooks, 2000). To exacerbate this problem, sleep deprivation can contribute to elevated stress levels (Sparks, Faragher, & Cooper, 2001). The second aspect of shift work is the shift-to-shift conflicts resulting from unfinished tasks, such as when a worker on the first shift leaves an assignment undone for a worker on the second shift to complete.

Sparks et al. (2001) discussed the interaction of work hours and sleepiness. Fatigue was found to be a major concern once a worker reached the 9-to-12 hour workday. Yet hospitals and other healthcare providers regularly use 12-hour shift assignments to stabilize staffing (Brooks, 2000). Physicians placed *on-call* for

emergencies for prolonged periods were susceptible to diminished performance and inability to carry out routine functions.

Similar problems were also determined by Weinger and Ancoli-Israel (2002). They found that sleep deprivation affected the performance of clinical practitioners and was an important issue for patient safety. They discussed research on medical residents and physicians in busy practices who work an excessive number of office and on-call hours. Surgical skills and the ability to treat and diagnose deteriorated for those who were sleep deprived.

Brooks (2000) discussed the problem of prolonged *night shift* work on performance, health disorders, and sleep quality. The latter is an important factor in reducing stress. He discussed the ability of some workers to adjust to night work after three or four consecutive shifts so that the quality of their sleep was not significantly different than those working *normal* hours. Those who worked nights on a regular basis adjusted more readily, in terms of performance and sleep quality, than those subjected to an erratic schedule of rotating shifts.

The impact of sleep deprivation on patient outcomes was also noted by Lundstrom, Pugliese, Bartley, Cox, and Guither (2002). Hours of work, shift rotation, and duration of shift were related to performance. Sleep disturbances were more common with rotating shifts and resulted in lower job satisfaction and higher on-the-job accident rates.

In her study of hospital quality of care in hospitals, Irurita (1996) examined the *handover* of assignments from employees on one shift to the next. Based on interviews with 22 nurses, Irurita stated that nursing staff continually prioritize tasks in terms of

immediate completion, omission, or delaying the work for those on the next shift to complete. Contributing to these decisions were patient safety and staff satisfaction.

Bowers, Lauring, and Jacobson (2001) stated that prioritizing and reprioritizing assignments were coping strategies for constant interruptions. The decision to leave a task undone is based on task complexity, the authority of the person who assigned the job, and the consequence of performing or not performing the task. Thoms, Dose, and Scott (2002) found higher levels of job satisfaction when employees were accountable to their coworkers for performing tasks, while Sella and Macleod (1995) found that conflicts between workers from one shift to the next contributed to decreased job satisfaction.

Training to Manage Stress

Human resource development practitioners have a tremendous opportunity to provide assistance and expertise to healthcare managers. The prospect for training and development programs in the areas of occupational stress is on the rise as organizations seek methods of improving the workplace environment. A number of successful ventures have been documented (Admi, 1997; Proctor, Stratton-Powell, Tarrier, & Burns, 1998; Rowe, 2000).

Admi (1997) investigated the effects of stress inoculation training on occupational stress, job satisfaction, and performance. Guided by the transactional theory of job stress of Lazarus and Folkman (1984), Admi maintained that inoculation training is preventive in nature. Anxiety and dissatisfaction among students of nursing can be minimized through focused training in anticipating and preparing for stressful situations.

Survey instruments were administered to 46 freshman nursing students in Israel.

Female participants numbered 42, and the average age was 22.6 years. The 32-item Nursing Students Stress Scale (NSSS) was administered to measure stress but no reliability estimate was reported. Self-esteem was measured using a scale developed in 1979, with reliability coefficients ranging from 0.88 to 0.91. A dissatisfaction scale was derived from a literature review and contained a reliability measurement of 0.70. State anxiety was assessed using the STAI and contained a reliability coefficient of 0.90.

Urine samples were analyzed by Admi (1997) to evaluate catecholamine levels. Catecholamine is a compound occurring naturally in the body, such as epinephrine (adrenaline) and norepinephrine. These prepare the body to meet emergencies such as shock, cold, attack, or stress. The clinical performance of students was also assessed, along four domains. These were (a) thinking ability, (b) motor skills, (c) interpersonal communications, and (d) professional attitudes.

Participants were assigned to three groups. One group of nursing students ($n = 12$) was administered a training intervention known as Stress Inoculation Training (SIT), 4 hours per week for 14 weeks. Admi (1997) described SIT as being analogous to biological immunizations, or even desensitization. Resistance to stress is developed by the trainee through incremental exposure to stressors common in the workplace.

The first phase of SIT involved conceptualization. Based on the NSSS results, the trainer prepared a scenario for which positive imagery skills and role play were used to address the stress arousal it created in students. Through discussion the facilitator reduced each situation into manageable parts for the participants. The second phase involved skill acquisition and rehearsal, including training in problem solving, use of peer support, and rehearsal in a laboratory setting. Phase three was application and follow through.

Students applied what they had learned to the hospital setting, then met immediately following the application to discuss and review progress.

A second group (n = 11) participated in the regular nursing program, but held on-site at the clinical setting. A third group (n = 23), serving as a control, received the customary nursing program in the school laboratory. All three groups were administered the various measurements at baseline and twice following completion of SIT.

Admi (1997) found low correlation coefficients between anxiety and dissatisfaction for the SIT participants. The scores of the other two groups were moderately to highly correlated with these two dimensions. For example, on the profession factor of the dissatisfaction scale, the SIT correlation coefficient was 0.13, whereas it was 0.49 for the clinical setting group and 0.44 for the laboratory group. Increased anxiety scores were related to increased dissatisfaction scores in all but the SIT group.

At baseline there were no statistical differences on the clinical performance scores among the groups. On midterm and final examinations, the SIT group had the highest performance scores of the three groups. Instructors gave the SIT team a composite rating of 91.1, compared to 80.6 for the clinical setting group and 88.2 for the laboratory students. Admi (1997) found no statistical differences in physiological responses based on training approach.

Rowe (2000) conducted a longitudinal study of the effect of training on burnout across various healthcare occupations. Based on the theories of Lazarus and Folkman (1984), the investigator hypothesized that participants could be taught to use problem-solving coping strategies when confronting situations that had potential solutions, and to

rely on emotion-focused coping when solutions were not apparent. Providing refresher training on coping at various intervals was suggested as a technique to mitigate the effects of burnout.

Questionnaires were distributed to 126 healthcare workers in the Philadelphia, Pennsylvania, area by Rowe (2000). Originally, 448 individuals had been invited to participate in a job-stress training program, to which 317 responded for a 71% reply rate. The researcher randomly selected 40% of these resulting in 126 participants, who were assigned to three groups. These were (a) experimental group 1, who received the training; (b) experimental group 2, who received the training and also refresher training at 5, 11, and 17 months; and (c) a control group who received no training.

Each of the three groups consisted of 42 members. The mean age of respondents was 38.22 and the average length in position was 7.9 years. No data on gender was provided. Employment categories included nursing, laboratory personnel, physicians, administrators, social workers, and psychologists. Specific details on the nursing employees were not provided, so it was not known if these were RNs.

Burnout was assessed using the aforementioned MBI. Stress was measured using the Stress Assessment Inventory (SAI) and coping was measured using the Ways of Coping Scale. The STAI, outlined previously, was utilized to assess anxiety. Rowe (2000) also measured hardiness, using the Cognitive Hardiness Scale. Reliability measures for the instrumentation were not provided.

To establish a baseline, all groups completed the entire battery of survey questionnaires prior to the training. Then, at subsequent intervals, the MBI was repeated. The training consisted of 6 weekly, 90-minute stress management and adaptive coping

workshops. Participants were taught the principles of problem-focused and emotion-focused coping strategies. During the sessions real-life case studies and testimonials from attendees were used to reinforce the training.

Rowe (2000) provided for the training of experimental group 1 for the 6-week period only. Experimental group 2 received the weekly training, and also an hour-long refresher course at 5, 11, and 17 months. The control group did not receive the training intervention. Two weeks following the conclusion of the initial training program, all three groups repeated the MBI. This occurred again at the 6-, 12-, 24-, and 30-month period.

The first group reduced to 38 members by the end of the 2.5-year study period. The second training group reduced to 39 members, and the control group ended with 36. This left 113 participants and an attrition rate of 10%.

Rowe (2000) compared her findings to normative data and found the Philadelphia healthcare workers were similar in stress, anxiety, and hardiness scores. She employed one-way ANOVA and the Tukey's Honestly Significant Difference test to make individual comparisons of group means after administering the MBI.

Prior to the training, no significant differences on the emotional exhaustion subscale of the MBI scores were observed between the three groups. At the 2- and 6-month intervals, the scores of the first and second experimental groups were significantly lower than the control group. At 1-year and the subsequent intervals thereafter, the second group (who received the refresher training) were significantly lower than the first experimental group and the control group.

Similar phenomena were observed on the depersonalization and lack of accomplishment subscales of the MBI. Whereas no differences were found between the

groups at baseline, as time went on the second experimental group achieved lower scores than the control group and the group who received the 6-week program only. Rowe (2000) concluded that, in the short-term, training to manage the effects of burnout was successful, but when reinforced with updated training the long-term effects were significant.

Proctor et al. (1998) investigated the effect of a training program on occupational stress and employee well being among residential caregivers. It was hypothesized that occupational stress levels reported by caregivers would be reduced by providing education regarding the psychological, social, and physical needs of residents, along with training in active coping and problem solving skills. *Care staff* was not specified, but it is presumed these were not RN-level personnel.

Proctor et al. (1998) studied caregivers working in ten residential care facilities and two nursing homes, paired according to size and accreditation standing. Employees from one pair were invited to participate in the training, while the other pair served as the control group. A total of 98 employees participated, as 51 received the formalized training and 47 in the other group did not. Females accounted for 94.9% of the sample. The intervention included 7 hours of instruction followed by training in behavioral management, care plan development, and the advantages of completing goals in small, manageable intervals while working with residents.

Psychological well being of employees was assessed using the GHQ, discussed previously. If the scores reported on the GHQ were of sufficient magnitude to refer the respondent to a psychologist for follow-up, Proctor et al. (1998) referred to this as *caseness* (p. 64). It was hypothesized that the non-trained control group would exhibit

caseness. The sources of pressure subscale of the OSI, described above, was utilized to measure job stress. The assessments were administered prior to the training intervention, then repeated 6 months later. Due to attrition, only 42 original members of the treatment group and 42 of the control group completed the follow-up questionnaires.

For the control group, 36.2% achieved caseness scores on the initial GHQ assessment. This percentage increased to 57.1 by the end of the 6-month review period. The training group experienced an increase as well, but it was not as dramatic. Prior to the training intervention, caseness was achieved by 33.3%. This rose slightly to 35.7% on the second assessment. Differences between the groups on the four subscales of the GHQ were also examined. As stated previously, these were (a) somatic symptoms, (b) anxiety and insomnia, (c) social dysfunction, and (d) severe depression. There was no difference in scores on the initial assessment, but at the 6-month interval the control group exhibited significantly higher scores on the somatic symptoms subscale. Based on these findings, Proctor et al. (1998) stated that those not receiving the training exhibited poorer health than the treatment group.

Scores on the sources of pressure subscale of the OSI were also compared between groups for those exhibiting caseness. Again, both groups reported increases but those who did not receive the training experienced a greater magnitude of increase. The findings suggested that psychological stress and occupational stress were both high for caregivers in this population. The researchers stated that other factors could have occurred in the intervening months to effect the scores of the follow-up assessment.

Proctor et al. (1998) concluded that a lack of training in dealing with aspects of the job that are complex and difficult will result in increased occupational stress for

workers. Formal education programs aimed at goal-setting and understanding patient needs are a good approach to managing stress on the job for healthcare workers. Training resources must be used effectively in order to meet the developmental needs of staff.

Rival Theories

The model advanced by Karasek (1979) was selected as the conceptual framework for developing an occupational stress instrument for health occupations. A number of other theoretical models were considered, but not adopted. Table 1 is a summary of major models of occupational stress, including burnout, under consideration.

Beehr and Newman (1978) wrote one of the earlier articles on workplace stress and it is cited often in the literature (Edwards, 2000; Iverson et al., 1998; Spector, 2000). Influenced greatly by the industrial and organizational research of that time period, they sought to introduce the concept of employee health into the field. They discussed the relationship between stressors and both psychological and physical health, and included a discussion of their relationship to turnover intentions.

From their review of the literature, Beehr and Newman (1978) determined that job stress consisted of the following facets: (a) environmental facet, which included job demands, role demands, organizational characteristics, and the organization's external demands; (b) personal facet, such as psychological and physiological conditions, and demographics; (c) process facet, which included psychological and physical processes; (d) human consequences facet, such as psychological and physiological health consequences, and behavioral consequences; (e) organizational consequences, such as changes in turnover; and (f) adaptive responses facet, comprised of responses such as increased religious activity and biofeedback. A final facet, time, was interwoven

Table 1

Major Stress Models and Theorists

Stress Model	Theorist(s)
1. Burnout	Maslach, 1976
2. Facet Theory	Beehr & Newman, 1978
3. Person-Environment Fit Theory	Caplan, Cobb, French, Harrison, & Pinneau (1975)
4. Job Demands-Control Theory	Karasek, 1979
5. Transactional Theory	Lazarus & Folkman, 1984

throughout all the others.

The Beehr and Newman (1978) facet approach resulted in a meta-model that spawned additional research (Beehr, 2000; Fletcher, 1999; Kemery, Mossholder, & Bedeian, 1987). Beehr has since stated that the *adaptive responses* facet should be renamed *coping* to better reflect modern thinking on the subject, while maintaining thatthe majority of occupational stress research has involved one of the facets enumerated above.

Caplan, Cobb, French, Harrison, and Pinneau (1975) and Harrison (1978) were among the primary contributors to the person-environment (P-E) fit theory of stress. According to the P-E fit model, psychological strain is viewed as the discrepancy between the demands of the job (environment) and the person's actual or perceived ability to meet those demands (Bunce & West, 1996; Fenwick & Tausig, 1994; Jamal & Baba, 2000). Individuals learn to cope with highly stressful jobs by finding those environments which *fit* their ability. Researchers have used P-E fit theory to isolate prospective stressors in the workplace (e.g., role ambiguity and lack of managerial support) and link these to worker attributes (e.g., coping skills and diminished health).

Some investigators have found that this model of stress places an unhealthy emphasis on the individual as being the sole determinant of stress outcomes (Schwartz, Pickering, & Landsbergis, 1996). They suggest that mangers would ignore workplace interventions for managing stress if this were the case. Others have different conclusions and see P-E fit as the best stress model for American workers. As emphasized by Edwards, Caplan, and Harrison (2000), "The core premise of P-E fit theory is that stress arises not from the person or environment separately, but rather by their fit or congruence

with one another" (p. 28).

The transactional theory of stress is chiefly attributed to the work of Lazarus and Folkman (1984). They accentuated the concept of cognitive appraisal, the process by which an individual construes an event to have meaning. In the present context, the process of cognitive appraisal explained how a person perceives something in the environment to be stressful. The bidirectional relationship between appraisal and the environment creates the transaction so that what is in one circumstance a consequence can become an antecedent to stress in another. Lazarus and Folkman noted, "Psychological stress, therefore, is a relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (p. 21).

The individual responds to psychological stress through coping, which Lazarus and Folkman (1984) described as efforts to continuously change appraisals and behaviors. Their contribution to coping theory was significant in this regard. Emotion-focused coping was described as attempts to reduce emotional responses to stress, while problem-focused coping was expressed as efforts aimed at managing the distressful difficulty (Fay, Sonnentag, & Frese, 2000; Mahat, 1998; Ogus, 1995).

Stress Scales Used In Research

Generic Stress Scales

A number of generic tools to collect job stress data are in existence. The Job Stress Survey (JSS) is perhaps the most recently developed (Vagg & Spielberger, 1998). The JSS can be distinguished by its measurement of both the severity and frequency of 30 sources of occupational stress. Gellis (1999) used the JSS in her research on 187 social

workers employed in a healthcare setting, while Thomas (2000) used the JSS in a study of 50 human service workers.

The OSI, developed by Cooper et al. (1988) is perhaps the predominant scale in the literature and popular in healthcare research (Proctor et al., 1998; Rees, 1995; Sweeney & Nichols, 1996). Despite Cooper's (2000) expertise and reputation in occupational stress studies, Lyne, Barrett, Williams, and Coaley (2000) raised doubts about the manner in which the OSI was developed and questioned the theoretical framework on which it is based. They maintained that portions of the original instrument were not pilot tested and recommended a different factor structure than that proposed by the OSI scoring manual.

Lyne et al. (2000) issued the OSI to 1,021 healthcare workers employed by Great Britain's National Health Service, of which 225 participated for a 22% response rate. Females accounted for 81% of those responding and 77% worked full time. Sixty-five percent (65%) were between the ages of 31 and 50. Survey forms were also completed by 319 telecommunications workers and 153 utility employees based in New Zealand.

The OSI has seven sections or questionnaires, described previously. Lyne et al. (2000) factor analyzed each section since there was "no published information on how the OSI subscales were derived" (p. 201). They attempted to extract the same number of factors for each questionnaire but were not able to do so. None of the rotated factor solutions on the sources of pressure subscale, the longest portion of the OSI with 61 items, were satisfactory to the researchers because items either cross-loaded or failed to load on the model. This meant that some of the items were intercorrelated with two factors or did not load at all. Cross-loadings are difficult to interpret, leaving the

researcher to make assumptions about why an item is correlated with two distinct subscales. A scale that separated sources of pressure as originating with the manager or employee was suggested.

The job satisfaction component of the OSI contains five subscales, but Lyne et al. (2000) could not replicate that many using their data. They could derive only two subscales, which separated the items into satisfaction derived from intrinsic and external facets, but these were incompatible with the OSI scoring manual. The Type-A behavior section also contained cross-loadings on many items. The investigators reasoned that the OSI was developed during the time that researchers began to question the validity of the Type-A construct, and that in its present format the questionnaire was obsolete.

Similar problems were encountered with the remaining sections of the OSI as a result of the factor analysis. Lyne et al. (2000) proposed 11 psychometric scales for the OSI, as opposed to the original 7. These were (a) intrinsic job satisfaction, (b) extrinsic job satisfaction, (c) mental ill-health, (d) physical ill-health, (e) Type-A behavior, (f) locus of control, (g) managerial pressures, (h) employee pressures, (i) workload, (j) lifestyle coping, and (k) occupational coping.

Described previously, Cooper addressed concerns other researchers had with the OSI in the study by Evers et al. (2000). Likewise, a study by Robertson, Cooper and Williams (1990) reported a lack of support for construct validity on the locus-of-control subscale. Validity problems with locus-of-control were also reported by Davis (1996).

Also described previously was the JCQ, developed by Karasek (1985). The JCQ is still widely used, as evidenced by the major stress study conducted by Cheng et al. (2000) in which 21,290 female registered nurses were surveyed. In addition to these

general stress scales, a number of healthcare-specific measures of stress were developed during the 1980s.

Healthcare Stress Scales

Nursing Stress Scale. As stated previously, Gray-Toft and Anderson's (1981) NSS was developed in order to measure the frequency and primary sources of job stress experienced by hospital nursing personnel. A review of literature resulted in their assertion that nursing employees reported greater stress levels than the general population, and that these experiences could be classified along three domains: the physical environment, the psychological environment, and the social environment. They asserted that no reliable and valid instrument existed at the time of their study with which to collect data on nursing stress.

The items of the NSS were determined by interviewing nurses, doctors, and hospital chaplains, although the specific method employed (such as a Delphi panel, Q-sort, or nominal group technique) was not revealed. The 34-item scale was administered to 122 nursing employees in one private hospital. The sample was not exclusively RNs as this group accounted for only 41% of the respondents. Thirty-four nursing assistants and 38 licensed practical nurses participated, in addition to the 50 RNs.

Gray-Toft and Anderson (1981) found seven major sources of stress using factor analysis which served as subscales for their theory. Consistent with their review of literature, these were divided into the three classifications detailed above. The physical environment, with a single factor of workload, included items such as inadequate staffing and paperwork requirements.

The psychological environment consisted of four factors. The death and dying

factor measured items related to death and suffering. The second factor, inadequate preparation, assessed feelings that dealt with not being equipped to deal with the emotional needs of patients and their families. The lack of support factor measured the frequency of situations in which the caregiver needed to talk about job problems but there was no perceived opportunity to do so. The fourth factor of the psychological environment was uncertainty concerning treatment, dealing with items such as questionable orders given by physicians and hesitation with informing patients of their prognosis.

The social environment was the third domain classification and included conflict with physicians and conflict with other employees. The conflict with physicians subscale measured fear of criticism and conflict, as well as the stress associated with making a care decision when the doctor is not available to consult with. Conflict with others was similar and measured the frequency with which the employee experienced conflict or criticism from supervisors or coworkers.

To determine the reliability of the NSS, Gray-Toft and Anderson (1981) repeated the scale on a sample of 31 nurses two weeks following the initial assessment and found a total test-retest reliability coefficient of 0.81. Test-retest reliabilities on the subscales ranged from a low of 0.42 on the inadequate preparation domain to a high of 0.86 on conflict with other employees. Internal consistency was also measured using a variety of techniques. These ranged from a Spearman-Brown coefficient of 0.79 to a Cronbach's alpha of 0.89 for the total instrument. Subscale internal consistency ranged from a low of 0.46 for lack of support to a high of 0.84 for inadequate preparation, using Spearman-Brown.

Administering three additional instruments assessed concurrent validity. The IPAT Anxiety Scale Questionnaire measured trait anxiety, the Affect Rating Scale (ARS) measured negative affect, and the Job Description Index (JDI) appraised job satisfaction. Gray-Toft and Anderson (1981) hypothesized that these were related to stress. The Pearson product-moment correlation coefficient for each of these with the NSS was determined. Two scales had positive but low correlation coefficients, while the third was inversely correlated, as follows: (a) IPAT Anxiety Scale, 0.39; (b) ARS, 0.35; and (c) JDI, -0.15. Only the correlations with the IPAT Anxiety Scale ($r = 0.39$) and the ARS ($r = 0.35$) were statistically significant.

Of particular interest to the present study was the consideration given by Gray-Toft and Anderson (1981) to turnover. Hypothesizing that higher stress scores would result in higher turnover rates, they found that RNs scored higher in each category. The professional nurses had mean NSS scores of 92.46 and a turnover rate of 16%. The mean scores for LPNs was 88.16 with a turnover percentage of 13. Nursing assistants scored 83.65 on the NSS and a turnover rate of 9% was reported. There was no explanation of how turnover was calculated. It is assumed to be a measure of separation from the facility and does not reflect transfers to part-time status.

The NSS continues to have excellent representation in the literature, despite the fact that it has been in existence for two decades. That Gray-Toft and Anderson (1981) found only 122 respondents from a convenience sample on which to base their findings, together with questionable correlation coefficients with other measures of concurrent validity, does not seem to detract from the utility of the NSS. This may be due, in part, to its not being copyrighted. Only 50 RNs were surveyed as part of the instrument's

development, yet it is chiefly used on RN populations.

As reported previously, Hemingway and Smith (1999) used two subscales in their study of occupational stress and withdrawal behaviors (turnover and absenteeism) in nurses. Healey and McKay (2000) used the NSS to measure occupational stress in their study of nurses in Australia. This study is reported in greater detail below.

Medical Personnel Stress Survey. Hammer et al. (1985) developed the Medical Personnel Stress Survey (MPSS). In addition to nursing personnel, this instrument was tested on physicians and various ancillary personnel, giving it appeal to occupations outside of nursing. The MPSS was established on data collected from the emergency departments in two studies, one performed at two New York hospitals and another in the Midwest, making it similar to the NSS in that the initial sample was hospital-based.

Specific information on how the original 64 items of the MPSS were derived was not provided. Subjects in each of three emergency departments were issued the prospective instrument, from which factor analysis revealed four subscales containing 48 items.

For the first study involving the two New York facilities, Hammer et al. (1985) stated that approximately 85% of employees at both participated in the study, resulting in 45 respondents at hospital *A* and 71 at hospital *B*, for a total of 116. At first, six factors were determined, resulting in the 48-item scale. These were again factor analyzed, resulting in four subscales.

The first factor, organizational stress, consisted of such items as high turnover and lack of care for patients. Four of the 10 items of the organizational stress factor were related to drug and alcohol use by employees. The second subscale was labeled

frustration and exhaustion and included items such as feeling drained after work and avoiding people who were demanding. The psychosomatic factor was comprised of items such as feeling in good health or experiencing family troubles. Two of the 12 items on the psychosomatic factor were also related to alcohol use by employees as a coping mechanism. The fourth subscale of the MPSS was job satisfaction and personal enthusiasm. This consisted of items such as feeling paid adequately and supportive supervisors. There was no attempt made to link the items related to drug and alcohol use to coping or general stress theory.

To assess the reliability of the MPSS, Hammer et al. (1985) found a Spearman-Brown split-half reliability coefficient of 0.80 for the total score. The Spearman-Brown coefficient for the organizational stress factor was 0.72; for the frustration and exhaustion subscale it was 0.75; for the psychosomatic factor it was 0.67; and for the job satisfaction and personal enthusiasm factor the coefficient was 0.63.

It was hypothesized that workers in Hospital B, located in an impoverished district, would have higher stress scores because their patients had increased mortality, lower socioeconomic status, and more frequent complaints than those of Hospital A. It was even reported that doctors and nurses at Hospital B engaged in physical and verbal abuse of patients. Hammer et al. (1985) found that Hospital B reported lower scores on the job satisfaction and organizational stress subscale, as well as lower overall scores (lower scores equate to higher stress). Only one brief reference was made to the sample mix, which consisted of physicians, nurses, and technicians, and no differences in scores were found among these.

In the second study, 58 employees working in the emergency department of a

large, private hospital in a Midwestern metropolitan area participated. In addition to the MPSS, measures included the Staff Burnout Scale for Health Professionals (SBS-HP), a demographic and major life event questionnaire, and a 9-item questionnaire related to occurrences of absences, on-the-job accidents, grievances filed, and similar occurrences. The SBS-HP was developed in 1980. Although it was not expressly stated, Hammer et al. (1985) apparently distributed the 48-item factor analyzed MPSS with four subscales, because a correlational analysis was performed on stress measures and the on-the-job occurrence items.

The Cronbach's alpha coefficient for the MPSS was 0.85, and a significant, negative correlation (r = -0.692) with the SBS-HP was reported. Given that a higher score on the MPSS and a lower score on the SBS-HP was preferred, this relationship was expected for the validity assessment. No differences were found between the MPSS scores based on job classification, which again was identified as physicians, nurses, and technicians, although in another place the expression *ancillary personnel* was used in the place of *technician* (p. 159). A number of associations between the total MPSS score and on-the-job occurrences were found, indicating increased stress led to more errors, incidents, and injuries.

The statistical breakdown of the sample mix was not provided, so there was no way to determine if the findings were based primarily on data collected from physicians, nurses, or otherwise. Also, there was no clear description of the technician category. It was not known if these were emergency medical technicians, which many such departments employ, or medical laboratory technicians (MLTs), or other ancillary staff, as the term was used once. Given that Hammer et al. (1985) maintained that the MPSS

was superior to the NSS because the latter was restricted to nursing personnel, a complete description of the sample mix would have been helpful.

A revised version of the MPSS (denoted MPSS-R and containing 20 items) was used in a study of case managers working in the mental health arena (Hromco, Lyons, & Nikkel, 1995). The Oregon-based case managers completed the organizational stress and job satisfaction subscales of the instrument, and were also asked about their tenure expectancy, which is an alternative expression for turnover cognition. Case managers reported rather low levels of organizational stress but higher levels of job dissatisfaction. A significant, negative correlation (r = -0.24) was found between tenure expectancy and job dissatisfaction, meaning that those reporting lower levels of job satisfaction expressed higher levels of turnover intention. Lower levels of job satisfaction were also associated with larger case loads (r = 0.26).

Cydulka, Emerman, Shade, and Kubincanek (1997) utilized the revised MPSS in their investigation of National Association of Emergency Medical Technicians (NAEMT) members. These emergency medical service (EMS) personnel were found to have reported high levels of stress, particularly within the organizational and psychosomatic stress and job satisfaction subscales.

Of the 3,000 NAEMT members contacted, 658 returned the completed survey together with a biographical data form, for a 22% response rate. Cydulka et al. (1997) pointed out that previous research on EMS workers had consisted of convenience samples in one location and that this national study was preferred. Higher scores for total stress were found among EMS personnel with between 2 and 12 months on the job. Based on this, the researchers surmised, "stress levels tend to decrease as persons become

more accustomed to their jobs" (p. 139).

Cydulka et al. (1997) also found higher overall scores for volunteers, as well as for those who had lower status credentials, such as basic life support BLS only. Volunteer EMS personnel could have experienced psychological strain resulting from the conflicting pressures of their volunteer work and full-time paying jobs. It was hypothesized that minimally trained EMS workers, those without advanced life support certification, would exhibit stress and frustration when unable to resuscitate a victim. Additionally, these workers would tend to be assigned to the more routine, non-life threatening situations, adding to their frustration.

The complete 48-item MPSS was utilized most recently in a study of air medical program personnel by Herron, Dean, Crane, and Falcone (1999). Rather low levels of stress were reported among the personnel of the newly merged Columbus (Ohio) Medical Flight, a critical care air and ground transport program. They attributed this to managerial planning which took potential stressors into consideration during the transition period.

Fifty of 104 transport personnel returned the anonymous survey, for a 48% response rate. Participants included basic emergency medical technicians, ground-based and flight paramedics, flight nurses, and mobile intensive care nurses. Herron et al. (1999) reported that the 50 respondents included 23 nurses (presumably RNs) and 27 *medics* (p. 17). In addition to the MPSS, respondents completed the Social Readjustment Rating Scale (SRRS), a measure of the relationship between major life events and illnesses. A score of more than 200 on the SRRS is interpreted to mean moderate life stress and a greater than 50% probability of developing an associated decline in health.

Those who responded indicated low levels of stress on both the MPSS and the

SRRS. The mean score for the SRRS was 130.9. The average scores for the subscales of the MPSS were as follows: (a) organizational stress, 37.4; (b) frustration and exhaustion, 51.3; (c) psychosomatic factor, 39.1; and (d) job satisfaction and personal enthusiasm, 31.7. There were no significant differences between job classifications. No correlation tables were provided, although it was reported that the two instruments correlated weakly.

Herron et al. (1999) attributed the low stress levels to management support. Stress management programs, counseling, and constant communication were considered vital to this outcome. Furthermore, leaders of the initiative possessed an overall awareness of the potential job-related anxiety that program mergers can create.

Nurse Stress Index. Harris (1989) published the Nurse Stress Index (NSI) to identify sources of stress for groups of senior nurses. As defined by Harris, senior nurses included *sister/charge nurse level upwards* (p. 342), indicative of the nomenclature used in Great Britain. Harris maintained that the validity of the NSS developed by Gray-Toft and Anderson (1981) had not been substantiated outside of the United States. By contrast the NSI was based on data from British nurses who had the added responsibility of supervisory duties.

The NSI was developed over the time period from 1984-1987 which Harris (1989) classified into three stages. The first stage, exploration, involved interviews, stress journals, and meetings with 259 senior nurses and 75 nursing officers. Content analysis of the information collected resulted in 140 sources of stress being identified. These were reduced to 71 by a panel of experts consisting of two chief nursing officers (CNOs), two nursing officers below the status of CNOs, and one nurse educator. These 71 items were

used as part of a broader survey and mailed to 650 nurses designated *sister/charge* and above and working in a Southwest health district of Great Britain. Questionnaires returned totaled 521 for a return rate of 80%, of which 515 responses were useable. These were then factor analyzed to reduce the 71-item tool to 52 items over eight factors.

The second stage of the NSI development process was replication from which a new factor analysis was established. Harris (1989) first added three items that had ranked among the top 20 stressors of the original group of 140, but had failed to emerge with the 52 items through factor analysis. The 55-item NSI was distributed to 720 senior nurses in a London health district, and 470 surveys were returned for a response rate of 65%. To assess validity of the NSI, participants also completed the Crown-Crisp Experiential Index (CCEI), developed in 1966, a measure of common personality disorders. Both principal components and maximum likelihood factor analyses were conducted on the data, using both orthogonal and oblique rotation methods. Principal components analysis with oblique rotation revealed six factors containing 44 stressors.

The first factor from the stage two analysis was managing the workload, which included items such as time pressure and deadlines and deciding priorities. Factor two was organizational support and involvement and consisted of dimensions such as lack of support from senior staff and only receiving feedback when performance was unsatisfactory. The third subscale was identified as dealing with patients and relatives, consisting of items such as bereavement counseling and dealing with relatives. Factor four was physical working conditions and contained only two items: lack of privacy and poor physical working conditions. The fifth subscale was home and work conflict, including items such as job versus home demands and over-emotional involvement.

Factor six was identified as confidence and competence in role and included items such as lack of specialized training for present tasks and bringing about change in staff and the organization.

During the third stage, a short form of the NSI, containing 30 items, was developed by Harris (1989) in conjunction with six senior nurses serving as subject matter experts. The purpose was to provide a symmetrical survey, with equal items in each subscale, that could be administered quickly. The short form maintained six subscales; however, the physical working conditions factor was dropped and managing the workload was split into two factors. Except for the physical working conditions items, the dimensions cited in the preceding paragraph were maintained for the 30-item short form of the NSI. Harris reported an internal reliability coefficient of 0.90 for the short form, and a split-half reliability coefficient of 0.89.

Harris (1989) discussed content validity. He cited inclusion of subject matter experts as evidence of content validity, as well as high response rates. He assessed concurrent validity by examining the relationship between the NSI and CCEI. When the CCEI subscale for hysteria was removed, the Pearson product-moment correlation coefficient for the total NSI and CCEI scores was 0.41. Harris concluded this indicated a moderate but positive correlation between the two instruments. The various disadvantages with selecting the CCEI for concurrent validity assessment, such as the long test-retest interval (1 year) used in the development of the CCEI, were considered.

Cooper and Mitchell (1990) utilized the NSI in their study of British nurses who cared for critically ill and dying patients. They sought to examine the differences between hospital- and hospice-based nurses in terms of job stressors predictive of job satisfaction

and mental health. Both groups reported high levels of stress associated with dealing with families and the conflicts between home and work.

Survey packets were distributed to 250 nurses working in seven hospitals and four hospices in northwest England. The hospital-based nurses were assigned to intensive care, neonatal intensive care, critical care or oncology units, where death and dying is confronted each workday. Nurses responding totaled 130, for a return rate of 52%, from which 117 were deemed useable. Thirty-seven (37) of these were from hospice nurses.

In addition to the short form of the NSI, the CCEI and the Job Satisfaction Scale were distributed. Cooper and Mitchell (1990) reported that the NSI also contained a short Job Dissatisfaction Scale, which had not been reported by Harris (1989). The researchers stated that "most of the items are applicable to all qualified nursing personnel" (p. 300). Interestingly, they added 17 items related to death and dying in their own factor analysis of the NSI, since "the NSI original subscales resulted from a factor analysis of responses given by nurses with different responsibilities than those in the present study" (p. 302).

This procedure resulted in eight factors with the first, called final relationship, consisting of 13 items and accounting for 27.4% of variance. The other factors were support and involvement, dealing with relatives and patients, workload, home affects work, role confidence and competence, death trajectory, and work affects home. Cooper and Mitchell (1990) found that hospital-based nurses caring for the critically ill have lower job satisfaction than hospice nurses caring for the terminally ill. The hospital-based nurses indicated that death and dying issues were greater sources of stress for them than for their hospice counterparts.

Healy and McKay (2000) utilized both the NSS and NSI in a study of RNs

working in Melbourne, Australia. The focus of the study was the effect of work-related stressors, job satisfaction, and humor on mood disturbance. Using the transactional theory of stress as advanced by Lazarus and Folkman (1984), the investigators considered the interdependence between stress and mood outcomes.

They received completed survey instruments from 129 RNs working at hospitals, nursing agencies, nursing homes, and community agencies in the Melbourne metropolitan area. Female respondents totaled 125, and the mean age of those surveyed was 36.8 years. No data were provided regarding response rates.

The NSS was used to measure levels of stress of the participants. As discussed previously, the NSS contained seven subscales divided into the categories of physical environment, psychological environment, and social environment. Healy and McKay (2000) stated that they used the job satisfaction subscale of the NSI to determine if job satisfaction had a buffering effect on mood disturbance. Interestingly, the developer of the NSI did not specifically identify a job satisfaction subscale (Harris, 1989).

Coping strategies were assessed using the WCQ, developed by Larazus and Folkman (1984). Mood disturbance was measured using the POMS (previously described). The Coping Humor Scale (CHS) assessed the degree to which respondents used humor as a stress coping mechanism.

Using hierarchical multiple regression, Healy and McKay (2000) found that workload was the highest stressor reported by nurses. Further, workload was the only significant predictor of mood disturbance. Where job satisfaction was analyzed, the predictor variables accounted for 17% of the variance in the dependent variable mood disturbance and had a significant main effect. Higher job satisfaction scores were

associated with lower job stress and mood disturbance scores.

Emotion-focused coping, expressed as escape avoidance, was a significant predictor of mood disturbance. Higher scores on humor coping were associated with higher mood disturbance scores, and this surprised Healy and McKay (2000) because it was inconsistent with previous research. They concluded that the presence of high stress scores was not sufficient to elevate job satisfaction to a level that improved negative moods.

Health Professions Stress Inventory. The Health Professions Stress Inventory (HPSI) was published by Wolfgang (1988). The instrument was developed to compare sources and levels of job-related stress as perceived by individuals working in various healthcare professions. Wolfgang asserted that stress studies in healthcare tended to focus on one occupational group.

Based on a literature review, a list of potential job stressors was compiled. After removing items unique to only one healthcare profession, Wolfgang (1988) settled on the 30 items that formed the HPSI. The items were presented in a simple inventory and ranged from statements such as *having so much work to do that everything cannot be done well*, to *caring for terminally ill patients*.

Wolfgang (1988) chose to use physicians, nurses, and pharmacists in his initial study, asserting that these represent the diversity of the health occupations in terms of education, decision latitude, and autonomy. Surveys were mailed to a sample of 3,105 professionals, from which 1,242 were returned for a 42% response rate. Physicians returned 291 useable questionnaires, the nurses returned 379, and the pharmacists provided 387, for a total of 1,057. To assess concurrent validity, participants also

completed the Index of Work-Related Tension (IWRT) which measured the frequency of feeling frustrated by work-related issues.

As a profession, nurses reported the highest level of stress on the HPSI with a mean score of 61.2 out of 120 possible points. The mean score for pharmacists was 56.0 and for physicians it was 46.9. The Pearson product-moment correlation for each of the mean scores on the HPSI and the IWRT indicated a relatively strong relationship. For nurses, the correlation coefficient was 0.78, for pharmacists it was 0.75 and for physicians it was 0.76.

Wolfgang collaborated with a Purdue University faculty member to conduct a factor analysis on the HPSI (Gupchup & Wolfgang, 1994). Their study focused on determining the intercorrelation of items on the HPSI and identifying the components of job stress experienced by pharmacists. These researchers did not use nurses in their factor analysis.

Registered pharmacists across the United States (n = 1,325) received survey packets containing the HPSI and scales on job dissatisfaction, organizational commitment, career commitment, and coworker social support. The mailing was described as random; however, no description of the sampling methodology was provided. Surveys totaling 755 were returned for a response rate of 56.9%, from which 573 were deemed useable based on criteria such as being in active practice and completing all of the enclosed instruments.

Gupchup and Wolfgang (1994) reported their first step to be exploratory during which the inter-item correlations were subjected to principal axis factoring. The resulting scree plot indicated that either three or four factors could be extracted, for which both

orthogonal and oblique rotations were analyzed. Four different factor solutions emerged: four orthogonal factors, four oblique factors, three orthogonal factors, and three oblique factors.

Further analysis showed that both three-factor solutions explained less variance than the four-factor solutions (35.4% as compared to 38.5%) and cross loadings were more prominent on the three-factor solutions. Gupchup and Wolfgang (1994) proceeded with comparisons of the four-factor solution, and ultimately settled on the oblique solution. The oblique solution had less cross loadings and would be easier to replicate (p. 516).

The four factors or subscales of the HPSI were then identified. The first was professional recognition, which included items such as not receiving adequate feedback on job performance and not being challenged by the work. The second subscale, patient care responsibilities, included statements such as caring for terminally ill patients and trying to meet societal expectations of quality patient care. Job conflicts, the third factor, included having so much work to do that everything cannot be done well and experiencing conflicts with coworkers, as examples. The subscale professional uncertainty included items such as fearing that a mistake will be made in the treatment of a patient and possessing inadequate information regarding a patient's medical condition. Cronbach's alpha coefficients ranged from 0.74 to 0.84 on the four subscales.

Gupchup and Wolfgang (1994) maintained that scores on the job dissatisfaction scale, organizational commitment survey, career commitment scale, and coworker social support survey correlated moderately and in the anticipated directions with the professional recognition, job conflicts, and professional uncertainty subscales of the

HPSI, providing evidence for construct validity. The patient care responsibilities subscale only correlated with job dissatisfaction scores.

The HPSI was utilized in a study by Erlen and Sereika (1997) in which they examined the relationship between ethical decision-making and stress in intensive care unit nurses. There was no explanation given for administering the HPSI, a tool intended for a variety of health professions, over the NSS or NSI, which were developed specifically for nurses. Nonetheless, a moderate amount of stress among nurses was found.

Nurses working in 16 critical care units at two university-affiliated hospitals in southwestern Pennsylvania were surveyed. Of the 80 nurses in their sample, 63 returned the research questionnaires for a 78.8% response rate. In addition to the HPSI, the respondents completed the Nurse's Ethical Decision Making-ICU (NEDM-ICU) questionnaire, adapted from a 1983 study and divided into two parts. Part I consisted of hypothetical situations designed to assess dimensions of ethical decision-making. Part II was a 47-item scale to measure nursing autonomy and patient rights. Cronbach's alpha for the subscales of Part I of the NEDM-ICU ranged from 0.81 to 0.89. Reliability measures for Part II ranged from 0.48 to 0.54. For the HPSI, the Cronbach's alpha coefficient was 0.85.

Females accounted for 93.4% of respondents ($n = 61$) and the average age was 30.2 years. The average length of service in the present position was 3.0 years. It is presumed the sample consisted of RNs rather than other nursing personnel because of the staff positions they held in critical care units (CCU). Due to the level of training required to work in a CCU, hospitals typically staff these areas with RNs with special skills.

Erlen and Sereika (1997) found mean scores of 58.0 (out of 120) while Wolfgang had reported mean scores 61.2 for the nursing group. These results indicate that the nurses in the study were experiencing moderate levels of stress. The item *caring for the emotional needs of patients* had the highest mean value of 2.73 (on a 0 to 4 scale). Increased stress levels were associated with decreased autonomy, but little evidence was provided that ethical decision-making contributed to stress in intensive care unit nurses.

In relation to the earlier discussion of group affiliation and religion, Erlen and Sereika (1997) found that 93.4% of respondents found religion to be of at least some significance. Importance of religion and job stress were moderately associated ($r = 0.34$). Religion was a research variable due to the emphasis of the study on ethical decision-making.

Support for the Proposed Model

As the review of literature indicated, occupational stress has been reported by nurses and other healthcare workers. Karasek's (1979) JD-C model has been utilized as the underlying premise for studying the effects of job strain. Empirical evidence has linked occupational stress to turnover cognition and, ultimately, to turnover. Nursing turnover has serious consequences for healthcare organizations facing critical shortages of licensed staff.

Sound theoretical support existed for the proposed model and instrument. First, nursing and other healthcare professions are ideal for testing the model because they are subject to stressful conditions and demanding workloads. Second, healthcare occupations consist of a heterogeneous group with respect to job titles, departments, shifts, and other factors. Third, decision latitude and job autonomy, as proposed by Karasek (1979), are

important to persons entering the nursing field. Finally, the study resulted in a modern, valid, and reliable instrument with which to measure stress in health occupations.

Summary of the Review of Related Literature

Researchers continue to use a variety of instruments developed in the 1980s to assess occupational stress among healthcare populations working in the 21st century (Cydulka et al., 1997; Erlen & Sereika, 1997; Healy & McKay, 2000; Hemingway & Smith, 1999). The industry has undergone significant changes since these were developed (Dworkin, 2002; Metzger, 1999; Schumacher, 2002; Snook, 1999). Many researchers have resorted to global items of stress and related concepts due to a lack of reliable measurements. Rees (1995), for example, maintained that the OSI was valid for healthcare workers despite its development for white-collar professionals.

CHAPTER IV

METHODS AND PROCEDURES

The research methodology for this study was *design and demonstration* in that a scale used to measure job stress across health occupations was designed, tested, and analyzed. Subjects completed self-report questionnaires measuring perceptions of occupational stress. The researcher determined those salient factors associated with occupational stress.

Design of Questionnaire

The proposed study concerned the development of a psychometric scale to measure job stress across healthcare occupations. A flowchart of the instrument design process used in the present study is presented in Figure 3. The theoretical framework was based on principles related to instrument design. As previously discussed, the work of DeVellis (1991) and Spector (1992) were of significance. In his work on scale development, DeVellis delineated some guidelines or steps for researchers to consider. These included the following:

1. Determine what is to be measured.
2. Develop an initial pool of items.
3. Determine the measurement format.
4. Ask subject matter experts to review initial item pool.
5. Consider including validation items.
6. Conduct a pilot study.
7. Assess item performance.
8. Determine the optimum length of the instrument.

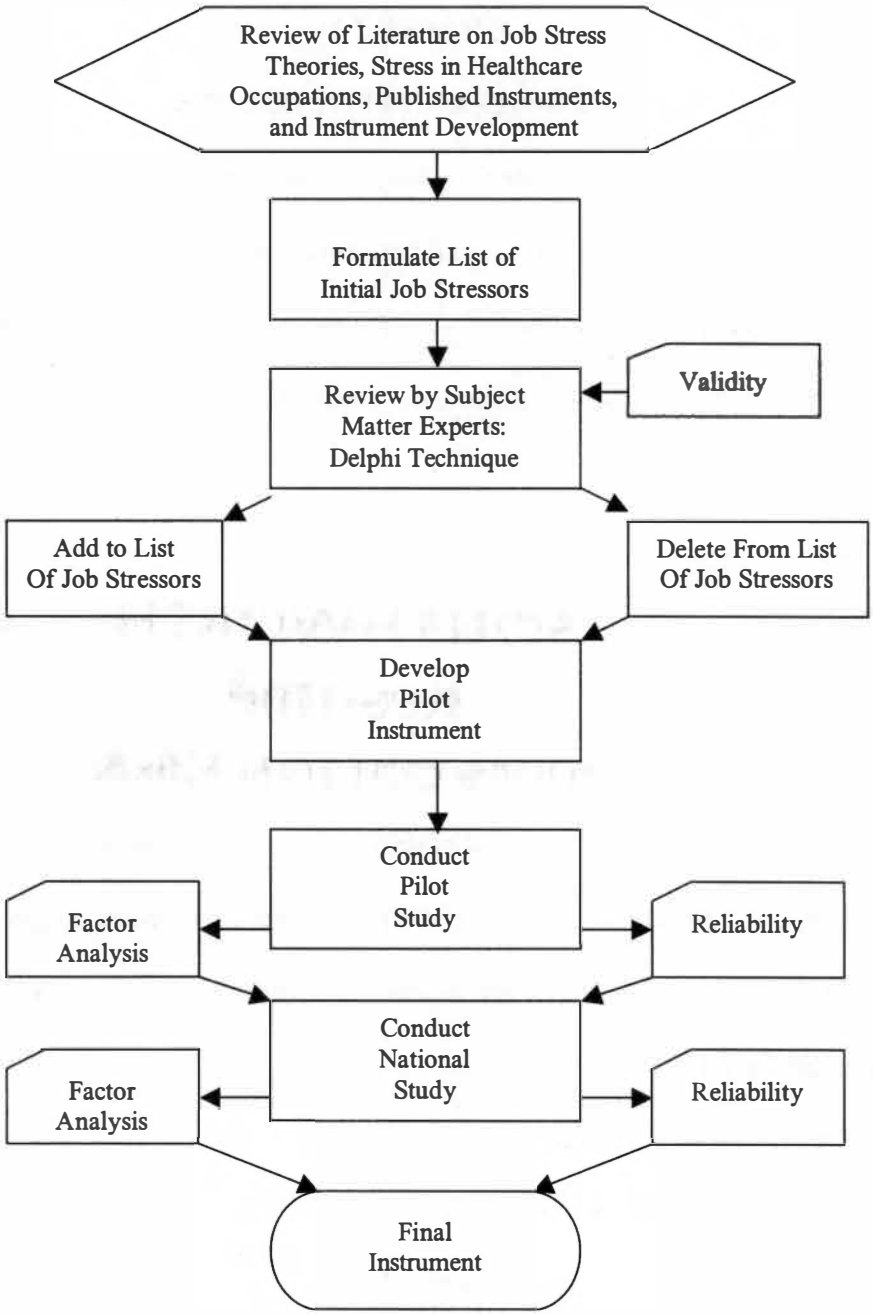

Figure 3. Flowchart of the instrument design process.

Determine What is to be Measured

According to DeVellis (1991), researchers turn to theory in order to identify latent variables such as stress, turnover cognition, and so forth. Theory should drive conceptualization and we use it to gain clarity about what is to be measured. Although one could make the remark, "I can see that you are feeling stressed," concepts such as occupational stress are latent variables that in actuality cannot be observed. We may *know stress when we see it*, but it is a phenomenon that is not tangible. Investigators sometimes use theory to determine what to eliminate from a study—a philosophical process of elimination—and to determine what to retain. Using a biblical metaphor, theory helps us to separate the wheat from the chaff in terms of what to measure.

In addition to theory, DeVellis (1991) found specificity of construct as an important component of the first step to scale development. Nunnally (1978) expressed the sentiment shared by many that all real-world variables related to human affectivity and behavior could be correlated in some way. The decision to measure general or specific constructs should be determined in the early stages of instrument design. Cooper et al. (1988) for example, created the Occupational Stress Indicator (OSI) to measure dimensions of workplace stress across various industries. Although the OSI has been used on numerous healthcare samples, it is a general instrument. A hospital Chief Executive Officer concerned about a turnover rate of 60% among certified surgical technologists may not find the subscale items on the OSI specific enough for problem identification.

The ability of the respondent to distinguish between concepts is also important to the test developer. If one is only interested in occupational stress, then items related to

general *life* stress should be excluded. Researchers sometimes erroneously use the expressions *job stress* and *burnout* interchangeably (when they are in fact distinct concepts) leading to concept redundancy. Specific examples of this phenomenon were addressed in the previous chapter.

Develop an Initial Pool of Items

DeVellis (1991) noted that the properties of any scale depend upon the items and that these should reflect the concepts the researcher intends to measure. A good review of current literature can assist the investigator with developing an initial pool of items for inclusion in the instrument. These should be considered *draft* items as they are subject to change based on review by subject matter experts, pilot testing, and additional examination.

The length of individual questions, level of reading difficulty, and proper syntax should be given serious consideration during item formation. Excessive wording should be avoided, given that increasing an item's length adds to its complexity. *I often think about quitting* is generally preferable to *most of the time I tend to consider submitting a resignation to my employer.*

Targeting a reading level between the fifth and seventh grades for most scales was recommended by DeVellis (1991), which would result in the length of items ranging from 14 to 18 words, and from 18 to 24 syllables (p. 58). Test developers often employ negatively worded items to minimize acquiescence bias, but double negatives should be avoided.

Notwithstanding the discussion above regarding redundancy, DeVellis (1991) found item redundancy to be acceptable in the initial development of scale questions. The

opportunity to compare two items that measure the same concept can be valuable in determining their common content, so long as both are not retained for the final instrument.

Isaac and Michael (1995) argued that item analysis leads to increased reliability and validity when each item in an instrument is tested to determine if it discriminates in the same manner as the overall scale.

Determine the Measurement Format

DeVellis (1991) stated that decisions regarding scaling methodology were to be made next. At this point the researcher must determine whether the scale will have increasingly higher levels of attributes, called a *Guttman* scale, or possess equally weighted values, or perhaps be formatted in a Likert design. Guttman scales possess patterns in which, among four or five choices, the individual who responds yes to item number 4 would also say yes to item 3, but not to item 5. Just as Guttman scaling has limited use, Likert scaling is perhaps the most popular technique used to measure human attitudes and perceptions and tends to have good reliabilities.

The number of response categories is also significant. DeVellis (1991) maintained that for some items a respondent may not be able to make the distinction between item number 3 (somewhat agree, for example) and item number 4 (agree). With summated rating scales the researcher must also decide if there is to be an odd or even number of choices. An even number requires, at the very least, a weak commitment towards one extreme or the other, while an odd number permits a neutral or *middle of the road* response.

Spector (1992) postulated four characteristics of a Likert scale, or summated

rating scale. These were as follows: (a) the instrument must possess multiple items; (b) the phenomenon measured by each item must be measured on a continuum; (c) each item has no correct or incorrect answer; and (d) each item is represented by a statement, which is then rated by the individual. For the present study, the rating scale employed for the Delphi technique phase, pilot study, and national study are described below.

Ask Subject Matter Experts to Review Initial Item Pool

The advantages of having subject matter experts review the initial item pool include determining if the intended constructs are actually measured, assessing item clarity and conciseness, and identifying overlooked aspects of the concept. Often this process is operationalized through use of the Delphi technique. A complete discussion of the Delphi technique is presented later in this chapter.

Consider Including Validation Items

DeVellis (1991) suggested that the inclusion of additional scales to measure related constructs was appropriate to consider at this stage in order to assess validity. Gray-Toft and Anderson (1981), Hammer et al. (1985), Harris (1989), and Wolfgang (1988) each developed healthcare-specific stress scales and included published instruments related to the constructs they were attempting to measure in order to provide evidence for concurrent validity.

For the present study, the utilization of published scales was considered. However, validity was established through the use of a 14-member panel of subject matter experts engaged in the Delphi technique. As discussed above, a well-constructed Delphi process establishes content validity (Chin, Ervin, Kim, & Vonderheid, 1999; Mitroff & Turoff, 1975; Teng & Calhoun, 1996; Touger-Decker, Barracato, &

O'Sullivan-Maillet, 2001).

Given that participants responded by mail, no additional instruments besides the HOSS were included in survey packets. It was hypothesized that a shorter, single-instrument survey would seem less burdensome to recipients than a multiple-instrument format, allowing response rate difficulties inherent in postal surveys to be mitigated.

Conduct a Pilot Study

According to DeVellis (1991), the instrument under development should be pilot tested on a sample sufficient in number to minimize subject variance. Nunnally (1978) suggested that this number was 300, and DeVellis admitted that successful scale development can occur with less. Spector (1992) placed this range between 100 and 200 respondents. Time and funding constraints sometimes limit pilot studies to convenience samples leading to issues about whether the test group is representative of the population.

The work of Borg (as cited in Isaac & Michael, 1995) provided some advantages of conducting pilot studies. These included (a) reappraisal of the data collection method, (b) feedback from the respondents regarding instrumentation, and (c) sufficient information to determine whether the study should continue (p. 38). Of the healthcare-specific instruments cited in the previous chapter, Harris (1989) was the only researcher who reported using a pilot study as a component of scale development. A description of the pilot phases of the present study is provided later in this chapter.

Assess Item Performance

Once the data are received from the pilot group, the performance of the individual scale items is assessed (DeVellis, 1991). The researcher wants to determine the reliability of the scale, as well as compare item performance against the criteria established under

section two above. Cronbach's alpha is a measure of the internal consistency of scale items, and a coefficient value of 0.70 or greater indicates the items are measuring the same constructs. Also of importance are item-scale correlations, item variances, and item means.

Gray-Toft and Anderson (1981), for example, used the test-retest method in their item evaluation and found a reliability coefficient of 0.81. Test-retest reliability is a measure of the correlation between scores resulting from the administration of the same scale to the same respondents. In addition to a Cronbach's alpha coefficient of 0.89, Gray-Toft and Anderson determined the Spearman-Brown coefficient to have an alpha value of 0.79. The Spearman-Brown formula provides an estimate of the reliability of scores if an instrument were shortened or lengthened (Isaac & Michael, 1995).

Harris (1989) found a split-half reliability coefficient of 0.89 for his instrument. Split-half reliability is derived from the correlation of scores on one half of a scale with scores from the other half and is a measure of internal consistency. For the present study, a Cronbach's alpha coefficient was determined for both the pilot form of the Health Occupations Stress Scale (HOSS) as well as the version mailed to the national sample.

Determine the Optimum Length of the Instrument

DeVellis (1991) concluded his guidelines for scale development with determining the appropriate length of the instrument. There is a point at which a scale has reached optimum length and the scale developer needs to recognize this. A balance needs to be found between brevity and sufficient length to obtain good reliability coefficients.

Respondents tend to look favorably on shorter scales because of the perception that they are less intrusive on the individual's time and effort. Longer scales tend to be

more reliable than shorter ones but can be subject to bias, such as when respondents select answers to the remaining questions quickly and erroneously just to end the exercise.

As stated previously, the findings of Spector (1992) contributed to the theoretical framework for this work. Spector suggested the following process be applied:

1. Define the construct under consideration.
2. Design the draft instrument.
3. Pilot test the draft instrument.
4. Administer the instrument and assess item performance.
5. Establish validity and normative data for the scale.

Except for establishing normative data, the other components are adequately discussed above. The initial sample can be used to establish reference scores, or norms, for subsequence users of the instruments. In this sense the norms provide a standard of performance, making it essential that the normative group be sufficiently large so that the results can be generalized to the population (Isaac & Michael, 1995).

For the present study, optimal scale length was determined through factor analysis in which an interpretable factor structure of occupational stress constructs was obtained. Following the pilot testing phase, the factor analyzed HOSS was distributed to a national sample of workers in health occupations. The results of their responses were used to conduct additional factor analyses on the instrument, resulting in a scale recommended for further research.

Overview of the Delphi Technique

The RAND Corporation developed the Delphi technique during the 1950s as an

approach to forecast the likelihood and impact of Russian bombing attacks on the United States (Dalkey & Hammer, 1963). Named for the *Oracle of Delphi* of Greek mythology (Walker & Selfe, 1996), the approach was soon adopted by technological forecasting experts and eventually found its way into other types of research. The technique involves leveraging collective intelligence through structured group communication (Brewer, Marmon, & Gilbert, 2002).

Linstone and Turoff (1975) are extensively cited for their contribution to the understanding and application of the Delphi method. They stated that the technique was useful in situations in which "the individuals needed to contribute to the examination of a broad or complex problem have no history of adequate communication and may represent diverse backgrounds with respect to experience or expertise" (p. 4). The method was also beneficial when time and cost constraints made face-to-face meetings infeasible.

Content Validity of the Delphi Technique

The use of a panel of experts provides content validity in order to minimize systematic error associated with research. According to Carmines and Zeller (1979), content validity "depends on the extent to which an empirical measurement reflects a specific domain of content" (p. 20). Brewer and Hunter (1989) stated that "a measure is content valid to the extent that its data provide an adequate sampling of the various social behaviors subsumed by the focal concept" (p. 131). According to Mitroff and Turoff (1975), the Delphi technique provides evidence of content validity because "the validity of the resulting judgment of the entire group is typically measured in terms of the explicit 'degree of consensus' among the experts" (p. 22).

Touger-Decker et al. (2001) examined nutrition education needs of dental,

physician assistant, nurse practitioner, and midwifery school graduates. They determined content validity by using registered dietitians and health professionals in each of the disciplines to serve on an expert panel that helped fashion the survey questionnaire. Teng and Calhoun (1996) studied the effects of organizational computing strategies on managerial decision-making. They maintained that the judgment of subject matter experts during the development stage of their data-collection instrument contributed to its content validity. Chin et al. (1999) studied the knowledge and attitudes of students entering the community health profession. Subject matter experts were utilized to develop the Community-Oriented Health Care Competency Scale. These were found to contribute to the content validity of the new instrument.

Scope of the Delphi Panel

Linstone and Turoff (1975) discussed the importance of selecting the right panel of experts for the problem under investigation. They argued that this was an issue for the formation of any group. They stated that Delphi "appears to provide the individual with the greatest degree of individuality or freedom from restrictions on his expressions" (p. 7).

Jeffery, Ley, Bennun, and McLaren (2000) discussed a range of 12 to 15 panel members as being appropriate. Ried (1988) and Walker and Selfe (1996) noted that panel sizes ranged from a few members to hundreds of members, depending on the topic and format of the research. Walker and Selfe found a response rate of 70% or greater as acceptable. Rubin, McMahon and Fong (1998) and Pesch (1996) reported response rates in the 80% range, while Blow and Sprenkle (2001) noted a return rate of 42%. Brewer et al. (2002), Duffield (1994), Rowe, Wright and Bolger (1991) and Walker and Selfe found

that it was common for the iteration process to last only two or three rounds until consensus was reached. These findings were consistent with the work of Linstone and Turoff (1975).

Delphi Measurement Methods

A Likert scale is commonly used to assess the rating of an item by panel members (Blow & Sprenkle, 2001; Erickson & Martin, 2000). According to Ried (1988), the Delphi monitor calculates summary statistics following each round, such as the median, and reports that back to the panel members for consideration during the next round. Jeffery et al. (2000) found the median to represent the most common value provided by a panel member and cited the interquartile range (the middle 50% of the scores) as a measure of consensus. The smaller the interquartile range was, the greater the consensus. The use of the median and interquartile range as measures of agreement and consensus was supported by several studies (Blow & Sprenkle; Jenkins & Smith, 1994; Rowe et al., 1991).

Adams (2001) and Erickson and Martin (2000) reported means back to panel members in successive rounds, and standard deviations as measures of consensus. Schmidt (1997), however, suggested that providing standard deviations to expert panels was misleading as they are not applicable to ordinal level data. Duffield (1993, 1994) proposed only means as a feedback measure for her panels and did not utilize interquartile ranges or standard deviations.

Delphi Technique Process

Ivancevich (1992) described the process of the Delphi technique as including the thorough questioning of each expert, through the use of questionnaires, in order to derive

educated forecasts of future conditions. Direct meetings are avoided so that independent thinking is maximized. Isaac and Michael (1995) maintained that the Delphi technique assisted the researcher in minimizing the effects of domination and manipulation sometimes observed in group meetings.

Greenberg and Baron (1993) admitted that the Delphi technique was potentially time consuming but concluded that the collection of expert judgments without the expense and logistical constraints of a meeting made it a very attractive approach. They recommended that the process consist of the following sequence of steps:

1. The researcher enlists the cooperation of the panel of experts.
2. The researcher presents the problem to the experts.
3. The experts record solutions and recommendations.
4. The responses are compiled and reproduced (by the instrument developer, in the present study).
5. The responses are shared with all experts.
6. The experts make comments on the ideas of others and develop solutions.
7. The solutions are compiled.
8. A decision is made if a consensus is reached.

This sequence was supported by the findings of Linstone and Turoff (1975).

Delphi Technique Formats

Linstone and Turoff (1975) described three forms of the Delphi method. These were (a) conventional, (b) real time, and (c) policy. In *conventional* Delphi, the process occurs as described by Greenberg and Baron (1993) above. For the *real time* method, the process involves computer programming, thus minimizing the delay inherent in

conventional Delphi. A third type was *policy* Delphi, the process by which strong opposing views are sought to solve complex policy issues. For this technique, consensus is not a desired outcome.

A popular variation of Delphi is the *reactive* method, in which panel members react to pre-generated items or questions in round one rather than produce a list of ideas (McKenna, 1994; Walker & Selfe, 1996). In this variation, the researcher might prepare a list of items from a review of related literature, and the subject matter experts would be asked to rate the importance of each item on some scale.

Human Resources Applications of Delphi

Frazer and Sechrist (1994) examined the effects of occupational stress on the health occupations of nuclear medicine, radiologic technology, and medical technology. The Delphi technique was used to determine 35 job stessors for each discipline. Improved communication strategies and managerial development were noted as solutions to this pervasive problem. Olmstead-Schafer, Story, and Haughton (1996) used the Delphi method to forecast training needs of public health nutritionists. It was the consensus of their panel that communication, policy development, and managerial skills be included in curriculum for training nutrition professionals by 2005. In a study of nursing unit managers and their roles, Duffield (1994) found the method useful in classifying competencies by the category of technical, human, and conceptual.

Halevy and Naveh (2000) used the Delphi technique in their study of the cost of non-quality (wastefulness) in Israel. They found that 20.8% of costs in the building sector of the economy was due to rework, inefficiency, and dealing with customer complaints, and that the waste of human resources was 5.3% of total sales for the nation. An iterative

approach to problem solving was recommended, including the incorporation of a cost-consciousness into daily work activities.

Based on a study of the best leadership development companies across the globe, Fulmer, Gibbs and Goldsmith (2000) noted anticipatory learning tools that emphasized the future included the Delphi approach. Schuler (1995) found that the method was beneficial in emergent or less structured subject areas such as human resources planning. In their book on program evaluation, Worthen, Sanders, and Fitzpatrick (1997) found the Delphi technique particularly useful for studies requiring a needs assessment.

Use of the Delphi Technique for the Present Study

Selection of the Delphi panel. Based on previous research (Jeffery et al., 2000; Reid, 1988; Walker & Selfe, 1996), a minimum of 12 Delphi panel members was established for the present study. Names of potential subject matter experts were obtained from members of the American Society of Healthcare Human Resources Administration (ASHHRA). After securing preliminary permission from the nominee, the ASHHRA member provided his or her name and electronic mail address. An individual was considered to be eligible as a panel member if he or she met the following four criteria:

1. The participant was a front-line (non-supervisory) staff member in one of the disciplines from which the samples would be drawn (nursing, radiology, or pharmacy), or a supervisor who recruited such front-line staff members.
2. The subject had at least 5 years of experience in his or her respective discipline.
3. The participant agreed to complete a demographic questionnaire.
4. The subject agreed to complete the Delphi questionnaire in each round.

Fourteen individuals were selected for the Delphi panel. Fifty percent ($n = 7$) were

from the nursing area, 29% were from radiology ($n = 4$), and 14% represented the pharmacy profession ($n = 2$). One of the nursing panel members was a faculty member of a nursing program. Prior to becoming an instructor, she had more than 10 years of experience as a critical care nurse and 5 years of experience as a nurse recruiter for a hospital. Another panel member was the vice president of human resources for a hospital with experience recruiting and retaining healthcare personnel.

Round 1 methodology. Delphi panel members were contacted via electronic mail with the following items as attachments:

1. A cover letter explaining the project and the panel member's role (see Appendix B).
2. A Biographical Questionnaire (see Appendix C).
3. Round 1 instructions and questionnaire (see Appendices D and F).

The *reactive* method of Delphi was employed, as the Round 1 Questionnaire contained 117 items based on the review of literature. The initial item pool was developed from various studies described in Chapter 3 (Aiken et al., 2001; Allen, 2000; Bowers et al., 2001; Brooks, 2000; Cangelosi et al., 1998; Cheng et al., 2000; Evers et al., 2000; Frazer & Sechrist, 1994; Gueritault-Chalvin et al., 2000; Hemingway & Smith, 1999; Hillhouse & Adler, 1997; Karasek, 1979; Mahat, 1998; Mesch et al., 1999; Nettleman, 1995; O'Connell et al., 2000; Ogus, 1995; Schommer, 2001; Sparks & Cooper, 1999; Taunton et al., 1997).

Appendix F provides the 117 original items. Panel members were instructed to read all items carefully before responding. The participant was to indicate the degree to which he or she believed each item was associated with occupational stress in healthcare,

according to a 7-item Likert scale. The range of responses was as follows: (a) strongly disagree, (b) disagree, (c) somewhat disagree, (d) neutral, (e) somewhat agree, (f) agree, and (g) strongly agree.

A space was provided on the questionnaire for the member to add any items he or she thought should be included in the survey. These would be made available for review of all panel members in the second round. A comments section offered a place for the respondent to note any items found to be ambiguous or confusing. After completing the Biographical Questionnaire and Round 1 Questionnaire, each was to be returned as an attached file by electronic mail.

Round 2 methodology. The Round 2 Questionnaire was sent as an attached file via electronic mail to the panel members who participated in the first round. The questionnaire contained the original 117 items from the first round, together with information about the median and interquartile range for each. The subject matter expert was again instructed to specify the degree to which he or she believed each item was indicative of occupational stress in healthcare. This was to be done according to the same Likert scale as in Round 1, ranging from 1 *(strongly disagree)* to 7 *(strongly agree).* For the second round, the panel member was to consider the median and interquartile range for each item prior to rating it. In this manner, the participants could reconsider their original scores in light of the feedback from other panel members.

Those items suggested for inclusion by first round panel members were added to the Round 2 Questionnaire. The participants were instructed to rate these additional items in the same manner as the first round. After completing the survey, the panel member was to return it as an attached file by electronic mail. Instructions for the Round 2

Questionnaire are presented in Appendix E.

Pilot Phase of the Present Study

For the present study, a pilot version of the HOSS was distributed to all RNs (n = 181), pharmacists (n = 10), and radiologic technologists (n = 25) employed at Parkridge Medical Center in Chattanooga, Tennessee, an HCA subsidiary. The pilot instrument was based on the results of the Delphi technique phase. Information obtained from the pilot study was used to clarify the items selected for inclusion on the final instrument. Participants received a cover letter explaining the project and the HOSS questionnaire.

Respondents were to indicate the frequency with which the item applied to them, according to a 7-item Likert scale. The range of responses was as follows: (a) never, (b) rarely, (c) occasionally, (d) half of the time, (e) frequently, (f) almost always, and (g) always. The rating *half of the time* was employed by Yao and Wright (2000), and for the present study this was preferred over the use of *sometimes*.

In addition to the occupational stress-related items, a section requesting demographic information was included. However, recipients were instructed to not place their name on the form, assured that their anonymity would be safeguarded, and that participation was voluntary. Respondents were asked to complete the items truthfully and to return the instrument to the Parkridge Medical Center human resources department in the envelope provided. Given the exploratory nature of the pilot testing phase, participants were encouraged to write questions, comments, or suggestions regarding items they found to be unclear, confusing, or difficult to understand. A copy of the cover letter is presented in Appendix G. The pilot version of the HOSS is shown in Appendix H.

To encourage participation in the pilot study, each survey packet contained a form on which the respondent could enter a drawing for a $25 gift certificate. The form requested the participant to provide his or her name, department, and work telephone number. Respondents were instructed to detach the form for the drawing from the survey materials and submit it separately to the Parkridge Medical Center human resources department. In this manner the gift certificate drawing forms could not be matched with the pilot survey questionnaires, thereby alleviating potential anonymity concerns.

Research Population and Sample

Figure 4 is a flowchart of the study design process. The population consisted of 50,668 RNs, 3,534 pharmacists, and 8,748 radiologic technologists working for subsidiary organizations of HCA. The 23 states in which HCA has facilities are presented in Table 2. According to Krejcie and Morgan (1970), a representative sample for populations over 50,000 (corresponding to the RNs) was 381. For populations over 3,000 (pharmacists), a sample size of 341 was required. For populations of 8,000 (radiologic technologists), the sample size required was at least 367.

In consultation with HCA, sample sizes of 2,000 RNs, 500 pharmacists, and 500 radiologic technologists working at United States-based facilities were selected. These values exceeded the guidelines established by Krejcie and Morgan (1970) and ensured that a sufficient response level was attainable. The Exactly method of random sampling was performed using version 11.0.1 of the Statistical Package for the Social Sciences (SPSS, Inc., Chicago, Illinois). This feature permits a user-specified number of cases to be randomly selected.

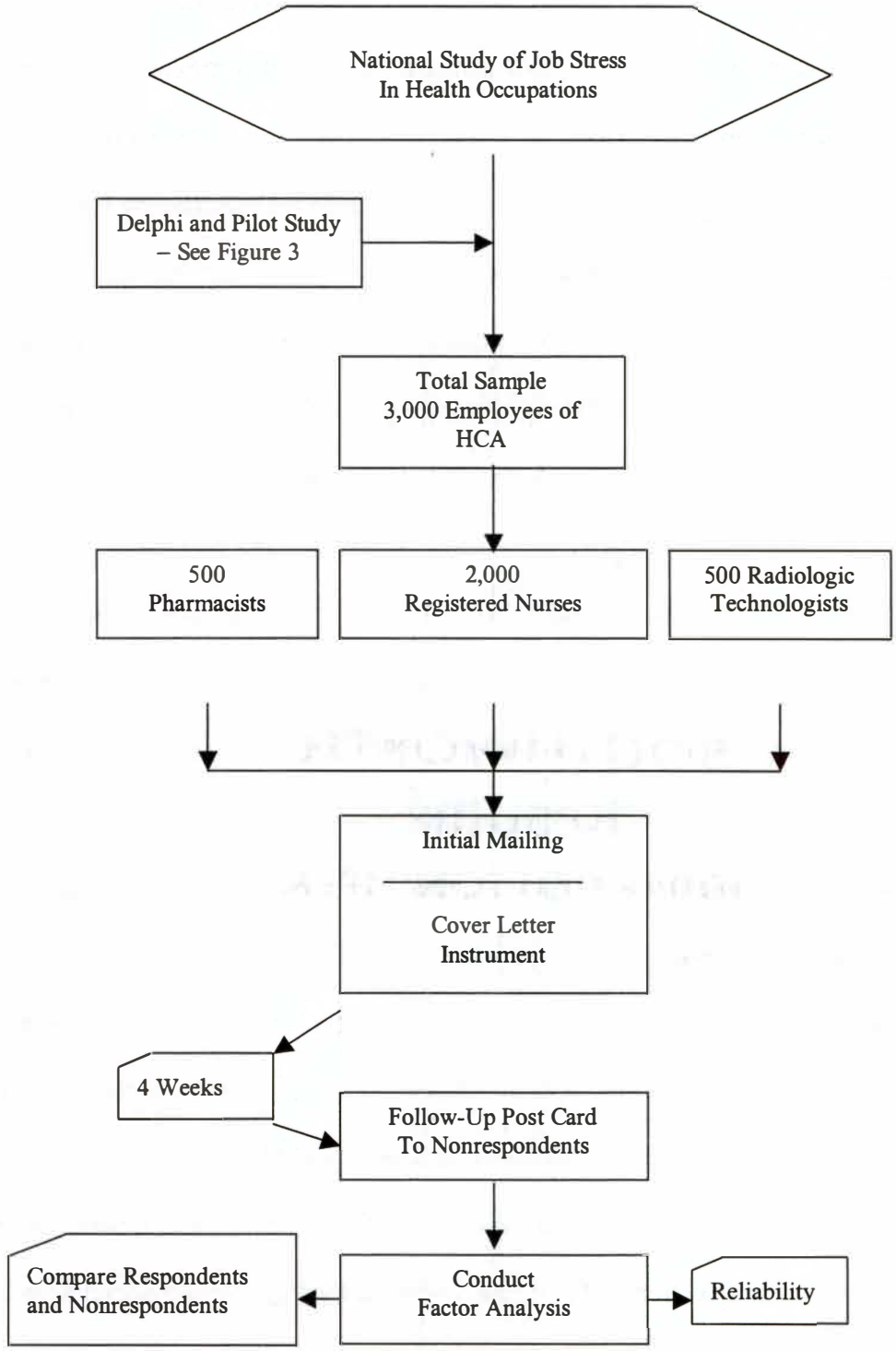

Figure 4. Flowchart of the study design process.

Table 2

HCA Facilities and Number of Respondents by State

State	Number	State	Number
1. Alaska	9	13. New Hampshire	11
2. California	48	14. North Carolina	1
3. Colorado	57	15. Ohio	4
4. Florida	242	16. Oklahoma	23
5. Georgia	67	17. South Carolina	21
6. Idaho	12	18. Tennessee	61
7. Indiana	13	19. Texas	169
8. Kansas	21	20. Utah	29
9. Kentucky	10	21. Virginia	68
10. Louisiana	40	22. Washington	0
11. Mississippi	0	23. West Virginia	16
12. Nevada	25		

Data Collection

Based on the results of the pilot study, respondents were asked to complete the HOSS by indicating the frequency with which the item applied to them. This was done according to the same Likert scale as in the pilot study, ranging from 1 *(never)* to 7 *(always)*. A section requesting demographic information was included, as well as 3 items intended to measure turnover cognition. These turnover items were added to the data collection activities in consultation with HCA. The company was interested in the results of the study as part of an overall turnover reduction strategy.

HCA sponsored the project by mailing the cover letter, HOSS questionnaire, pre-paid return envelope, and follow-up post cards to the sampled employees. Participants were instructed not to place their name on the form, to complete the items on the HOSS truthfully, and to return the instrument in the envelope provided. They were assured of anonymity and that participation was voluntary.

A unique alphanumeric code was added to each HOSS questionnaire by HCA. This enabled the non-respondents to be identified for purposes of mailing follow-up post cards and provided a means of drawing for four gift certificates from among those responding. The purpose of the gift certificates was to improve the response rate.

The pre-paid return envelopes were addressed to the Human Resource Development department at the University of Tennessee in care of the researcher, and not to HCA. It was determined that this would moderate potential concerns regarding anonymity. However, the letter explained that the study was endorsed by HCA and a company e-mail address was provided in the event an employee had a question or concern about the study. Likewise, the telephone number of my doctoral committee

chairperson was provided.

At the request of HCA, a statement was added which explained that the present study was not part of the annual employee survey conducted by The Gallup Organization on behalf of the company. Given that the organization periodically assesses employee perceptions, it was surmised that a recipient who had participated in one of the other HCA surveys might consider the request to complete the HOSS duplication and fail to respond. A copy of the survey cover letter is provided in Appendix I, and a copy of the HOSS mailed to employees of HCA-affiliated facilities is provided in Appendix J.

A follow-up post card was mailed to non-respondents 4 weeks following the initial mailing of the survey packet. The card stated that the recipient's survey had not been returned as of the date on the card, and that the response of the individual was very important to the study. Again, I provided the telephone number of my doctoral committee chairperson. A copy of the follow-up post card is shown in Appendix K.

Description of the Analysis

Factor analysis was conducted on the data collected using the HOSS in both the pilot and final phase of the project. Harris (1989) and Ripley (1998) reported factor-analyzing both pilot and final versions of instruments during their development. This statistical procedure enables a researcher to reduce a large number of variables to a smaller number of latent constructs (Nunnally, 1978). A factor is a grouping, or cluster, of highly intercorrelated variables. According to Nunnally, factor analysis is useful for determining if these correlations tend to fragment into several common factors, are dominated by one common factor, or are dominated by several common factors. Kim and Mueller (1978) observed that common factors result in the creation of more than one

observed factor, whereas one common factor, or unique factor, creates only one observed variable.

Spector (1992) stated that exploratory factor analysis is a basic method for scale development. Specifically, principal components analysis will be conducted to complete this exploratory analysis, as Kline (2000) found this to be the most usual approach to initial item condensation. Nunnally (1978) recommended this condensing of variables into a few common factors as the first step in factor analytic studies in which the researchers were looking for factors instead of testing hypotheses. Carmines and Zeller (1979) referred to this identification of factors prior to their rotation as *extraction*. DeVellis (1991) asserted that researchers should extract all primary factors, or "factors that account for important covariation among items" (p. 96).

A scree plot provides a graphical representation of the eigenvalues in descending order and indicates how many factors account for the majority of variation among the items. The eigenvalues are plotted from highest to lowest along the vertical axis, with the number of the item along the horizontal axis. The eigenvalues drop sharply in magnitude and level out, resulting in the shape of a cliff with rock debris or *scree* at the bottom. Some researchers use this leveling-out point as the cut-off for selecting the number of factors to extract. When there is no leveling-out point, factors with eigenvalues greater than one are retained (Kline, 2000). Kim and Mueller (1978) stated that this was the most common method of factor extraction.

An eigenvalue is a measure of the variance in a group of variables accounted for by a specific factor and is the sum of the squared factor loadings of a factor. Psychometric theory assumes that the eigenvalue for any single item has a value of one

(Kline, 2000). Therefore, a factor must have an eigenvalue of at least one, otherwise it would account for less variance than an individual item and be of no theoretical significance.

Factor loadings are the correlations between each variable and factor. As a factor analysis is represented in a data matrix (Kim & Mueller, 1978; Nunnally, 1978), a factor is a column of numbers that can be correlated with any other column of numbers. Using a path diagram to illustrate this relationship, DeVellis (1991) identified a factor loading as the standard coefficient for each path leading from a factor to an item. Some factor loadings are negative and this is sometimes desirable depending on the wording of the individual items in the instrument. An item is said to *load on* a factor when the correlation is above a specified value. Spector (1992) and Nunnally suggested an item-factor correlation coefficient of at least 0.30 as evidence of an item loading on a factor.

Once the factors have been identified, the loadings are transformed through geometric rotation so that the researcher can better analyze the factors against theory. Factor rotation makes the solution to factor analysis more interpretable. Rotation aids the investigator in analyzing various patterns of item-factor correlations (factor loadings) that make theoretical sense, as opposed to simple mathematical correlations. Kline (2000) stated that the two axes can be rotated into any relative position to each other, and each position provides new factor loadings. Nunnally (1978) surmised that both the rotated and non-rotated factor matrices explain the same common variance since the sum of the products of their loadings in any two rows is the same. Such properties make the rotated factors of increased value if they are more readily interpretable than the non-rotated.

Conceptually, *simple structure* (DeVellis, 1991; Nunnally, 1978) exists where

each of the items have factor loadings of zero on all but one factor. In this instance, a subset of items would be associated exclusively with one factor, another subset of items would be associated with a second factor, and so forth. Simple structure results in a solution that is readily interpretable by the researcher.

For the present study a *varimax* rotation with a *Kaiser* criterion was used. According to Kim and Melluer (1978), varimax is "a method of orthogonal rotation which simplifies the factor structure by maximizing the variance in a column in a pattern matrix" (p. 79). *Orthogonal* rotation occurs when the factor vectors are maintained at right angles, no correlation between factors is assumed, and the items are statistically independent. By specifying the Kaiser criterion, only eigenvalues greater than one were used in the solution. Kline (2000) stated that if orthogonal rotation leads to simple structure, it is preferred over oblique rotation for the reason that "the factor loadings are equivalent to the original analysis and that we are dealing with the actual factors" (p. 76).

Another rotation procedure, *oblique*, assumes the factor vectors are correlated and not held at right angles in geometric rotation. Nunnally (1978) and Kline (2000) discussed whether orthogonal or oblique was "better." Both agreed that oblique solutions are often hard to interpret. Of human subjects Nunnally asserted that "all abilities tend to correlate positively with one another," (p. 378) and this resulted in a slight preference for orthogonal rotation.

Given the sample size, the factor analysis approach of *maximum likelihood* was not employed. The maximum likelihood technique estimates the population characteristics most likely to have resulted in the data. Nunnally (1978) found that as sample size increased, the communality of variables increased as well using the

maximum likelihood estimation. Communality refers to the proportion of shared variance between factors, which Nunnally maintained should be independent of the sample size. Kline (2000) agreed with these findings when he stated that "with robust factors, maximum likelihood factor analysis gives results essentially identical to those of principal factors and components analysis" (p. 58).

Summary of Methods and Procedures

The research methodology for the present study was based on the theoretical framework of DeVellis (1991). An initial pool of 119 items was established based on a review of literature. A 14-member Delphi panel was used to reach a consensus on a subset of items. This subset formed the items on a pilot instrument that was tested on 161 employees at a hospital in Tennessee. After factor analysis was conducted on the pilot instrument, the revised scale was mailed to 3,000 health professionals in 23 states. A factor analysis was conducted using the data from the respondents that resulted in an instrument recommended for additional research.

CHAPTER V

FINDINGS

Results of the Delphi Technique

Round 1 Findings

Twelve subjects responded to the Round 1 Questionnaire for an 86% response rate. Table 3 provides a demographic summary of the respondents. The first round results indicated that the panel of experts reached a preliminary consensus on 21 items without the knowledge of each other's scores, based on the medians and interquartile ranges. Given a score of five or greater indicated the respondent agreed with the individual item being rated (5 = *somewhat agree*), a median of five or greater was a measure of consensus that the item was indicative of occupational stress.

An interquartile range of two or less indicated minimal variance between the first and third quartile scores for the item. The interquartile range is the middle 50% of the scores. Blow and Sprenkle (2001), Jenkins and Smith (1994), and Rowe et al. (1991) reported use of medians and interquartile ranges as measures of agreement for similar studies.

The results of the first round are presented in Appendix F. The 21 items on which the panel members agreed are noted. Respondents strongly agreed on two items, each with a median of 7 and interquartile range of less than 2: (a) item 1, *I care for critically ill or injured patients who may die*; and (b) item 19, *I have to balance job demands and home demands*.

Three respondents submitted a total of 10 additional items for inclusion in the questionnaire for the second round. These responses represented dimensions of

Table 3

Delphi Panel Characteristics

	Title	Years in Position	Years in Profession	Gender	State
1.	Registered Nurse	11	26	Female	Florida
2.	Registered Nurse	13	23	Female	New Jersey
3.	Registered Nurse	8	14	Female	New Jersey
4.	Radiologic Technologist	3	9	Male	Washington
5.	Nursing Instructor-Registered Nurse	3	22	Female	Tennessee
6.	Director of Nursing	5	19	Female	Tennessee
7.	Director of Radiology	< 1	18	Male	Missouri
8.	Radiologic Technologist	2	17	Female	New Jersey
9.	Pharmacist	8	18	Male	Florida
10.	Director of Pharmacy	7	18	Female	Missouri
11.	Vice President Human Resources	7	24	Female	Tennessee
12.	Registered Nurse	2	11	Female	New Jersey
13.	Director of Radiology	4	31	Female	Tennessee
14.	Registered Nurse	4	22	Female	Florida

occupational stress from healthcare professionals who worked in stressful environments every day. These additional items are presented in Table 4.

Three panel members submitted comments on the Round 1 Questionnaire. Topics included the perceived shortcomings of interval scale data and how responses might be affected by staff shortages. Verbatim comments received are presented in Table 5.

Round 2 Findings

As explained in the previous chapter, the Round 2 Questionnaire contained information about the median and interquartile range for the original 117 items, in addition to the 10 items suggested for inclusion (see Appendix E). All 12 participants from the first round completed the Round 2 Questionnaire, for a 100% response rate.

The criteria to establish consensus on an item was the same as that for Round 1. The item had to contain a median score of 5 and an interquartile range of 2.0 or less. Given these conditions, the second round results indicated that the panel of experts reached a consensus on 38 items. Round 2 results are presented in Appendix F. For the 10 items suggested from the first round, none met the median or interquartile range criteria of consensus from Round 2 (see Table 4). These 10 appeared to be redundant with the original 117 items, and this may have affected their scoring by the panel members.

For the present study only two rounds of the Delphi technique were employed. In the judgment of the researcher additional iterations would not provide additional information or substantially different results than those evident following Round 2. As Lintstone and Turoff (1975) cautioned, "a point of diminishing returns is reached after a few rounds" (p. 229). Duffield (1994), Rowe et al. (1991), and Walker and Selfe (1996) reported that Delphi iterations of two rounds were common.

Table 4

Items Suggested by Delphi Panel

No.	Median	IQR	Item
1.	3.0	2.0	My organization does not offer the opportunity to cross train.
2.	3.0	2.0	I do not receive adequate information regarding my department or the hospital.
3.	5.0	2.0	System/process breakdowns (lack of patient transport, inconsistent linen supply, the need to locate stretchers, etc.) get in the way of doing my job.
4.	4.0	2.0	I do not feel appreciated for the work I do.
5.	4.0	3.0	I do not receive recognition for the work I do.
6.	4.0	1.0	Physicians make me feel unvalued as a healthcare professional.
7.	4.0	3.0	Retirement benefits are not adequate.
8.	5.0	4.0	I must work holidays and weekends.
9.	5.0	3.0	I must work with transient staff such as traveling nurses or agency nurses.
10.	4.0	2.0	There are too many inexperienced nurses to work with in critical care.

Table 5

Comments from Delphi Panel

No.	Comments
1.	Stress levels rise not only when we are working short a nurse, but when there is no secretary or PCT[a].
2.	Some of the questions such as #117 depend on the patient census so 7 is an answer for only "some times."
3.	It was a little hard to answer some of the questions as the average worker because I have been and still am on both sides of the fence. This colors my answers. I always want to have a place to explain my answers based on "where" I am at the time.
4.	As I answered these questions, it struck me that at different times or on different days that I would complete this, my answers might be different.

[a]Patient care technician, another term for nursing assistant.

Results of Pilot Study

The 38 items on which the Delphi panel of experts reached a consensus formed the basis of the pilot instrument. The 38 items, together with a section requesting biographical information, formed the pilot version of the Health Occupations Stress Scale (HOSS). The instrument was issued to 181 RNs, 10 pharmacists, and 25 radiologic technologists working at Parkridge Medical Center in Chattanooga, Tennessee. The pilot version of the HOSS is presented in Appendix H.

Descriptive Statistics

HOSS questionnaires were received from 129 participants, for a 59.7% response rate ($N = 216$). Of these, 101 were registered nurses (RNs), 8 were pharmacists, and 20 were radiologic technologists. Females accounted for 75.2% of the participants ($n = 97$); 93.8% of respondents were white ($n = 121$); and 31.8% were from the age category 46 to 55 years ($n = 41$). Table 6 provides a summary of selected demographic characteristics.

Married participants accounted for 69% of those responding ($n = 89$). For shift, 103 employees indicated they worked primarily during daytime hours (79.8%), and 113 worked for Parkridge Medical Center on a full-time basis (87.6%). For education level, 59 reported they earned an associate's degree in nursing (45.7%) and 21 had baccalaureate nursing degrees (16.4%).

Length of service with the organization was 2 to 5 years for 33 of the participants (25.6%), and 42 reported being in their present position for 2 to 5 years (32.6%). Seventy-two indicated they supervised other workers (55.8%). The radiology department had 23 employees respond (17.8%), matched by RNs working in general medical and surgical units (17.8%).

Table 6

Selected Demographics for Pilot Study

Variable and Level of Responses	Frequency	Percent	Cumulative Percent
Title			
RN	101	78.3%	78.3%
Pharmacist	8	6.2%	84.5%
Radiologic technologist	20	15.5%	100.0%
Total	129	100.0%	
Gender			
Female	97	93.8%	93.8%
Male	32	24.8%	100.0%
Total	129	100.0%	
Race			
African American	3	2.3%	2.3%
White	121	93.7%	96.0%
Hispanic	2	1.6%	97.6%
Asian American	2	1.6%	99.2%
Other	1	0.8%	100.0%
Total	129	100.0%	
Age Category			
< 25 years	2	1.6%	1.6%
26 – 35 years	36	27.9%	29.5%
36 – 45 years	32	24.8%	54.3%
46 – 55 years	41	31.7%	86.0%
> 55	16	12.4%	98.4%
Missing Value	2	1.6%	100.0%
Total	129	100.0%	

Sixty-eight (68) employees rated the level of support received from their supervisor as being high (52.7%). For level of support received from staff support personnel, 61 indicated it was medium (47.3%). The number of people in the household was between 3 and 5 according to 57 of those participating (44.2%).

Table 7 shows the mean scores and standard deviations for each of the 38 items on the pilot version of the HOSS. The highest mean score reported (6.20) was for item 6, *I am expected to work hard*. The lowest mean score (2.61) was reported for item 11, *I experience conflicts with coworkers.*

Factor Analysis

Principal components analysis was performed on the pilot data using SPSS for Windows (SPSS, Inc., Chicago, Illinois), version 10.1.0. A varimax rotation method was used with the Kaiser normalization rule specified. A 21-item, four-factor solution provided the most interpretable solution consistent with the data.

Total variance explained. Table 8 provides the total variance explained by the four-factor model. In the *Initial Eigenvalues* column, the pre-rotation eigenvalues are reported, as well as the percent of variance the factor explained in the solution. A low eigenvalue means that the factor contributes little to the explanation of the variance between scores on the instrument. The table shows 38 factors, one for each item. However, only the first four are extracted because the four-factor model resulted in no cross loadings on any of the items.

The *Rotated Sums of Squared Loadings* column of Table 8 lists only the factors extracted for the model. The eigenvalues in this column resulted after rotation improved the interpretability of the factors. The cumulative percent of variance explained is the

Table 7

Mean Scores and Standard Deviations for Pilot Study

No.	Mean	Standard Deviation	Item
1.	4.44	1.531	I experience conflicting demands on my job.
2.	4.41	1.584	I care for critically ill or injured patients who may die.
3.	5.09	1.632	I am interrupted by telephone calls while performing tasks.
4.	5.34	1.589	I attend meetings required for accreditation or regulatory reasons.
5.	5.22	1.610	I have to balance job demands and home demands.
6.	6.20	0.939	I am expected to work hard.
7.	4.39	1.815	I am not paid adequately for my work.
8.	4.79	1.529	I spend too much time entering items into the computer system.
9.	3.00	1.231	I experience conflicts with physicians.
10.	3.92	1.250	Employees quit my organization.
11.	2.61	1.059	I experience conflicts with coworkers.
12.	4.26	1.503	I am tired when I wake up.
13.	4.61	1.416	I spend more time doing paperwork than taking care of patients.
14.	5.99	1.093	My job is mentally demanding.
15.	4.95	1.734	Patients are brought to my department for treatment/tests when we are already busy.
16.	2.94	1.494	Efforts have been made by management to redesign my job.
17.	4.15	1.415	The expectations regarding my work assignments are excessive.
18.	2.87	1.247	Physicians are disrespectful.
19.	3.42	1.570	I am pressured to work overtime or past the end of my shift.
20.	3.87	2.157	I supervise the assignments of others.
21.	4.55	2.061	I keep up with records required for accreditation or regulatory reasons.

Table 7

Continued

No.	Mean	Standard Deviation	Item
22.	4.30	1.673	I fear making a mistake on my job.
23.	3.98	1.698	I experience workplace politics on the job.
24.	4.11	1.487	There is low morale among employees.
25.	5.50	1.310	I am expected to work fast.
26.	4.48	1.516	I spend more time entering things into the computer than taking care of patients.
27.	3.61	1.657	My work places a great demand on my family.
28.	4.20	1.449	I spend too much time trying to keep up with the work load.
29.	4.64	1.698	Insurance companies have more control over my patient's care than I do.
30.	4.97	1.607	My job is physically demanding.
31.	3.49	1.409	Employees are absent or tardy.
32.	3.01	1.455	I spend more time on accreditation or regulatory issues than taking care of patients.
33.	3.40	1.699	I deal with the death of patients.
34.	4.62	1.537	I have a hectic work schedule.
35.	4.80	1.744	We receive new patients in my department just before quitting time.
36.	4.33	1.420	There is a lack of communication between departments.
37.	4.91	1.560	There is not sufficient time to take rest periods or meal breaks.
38.	4.26	1.918	I think about work when I prepare to go to sleep.

Note. The range for all items was 1 to 7.

Table 8

Total Variance Explained for Pilot Study

	Initial Eigenvalues			Rotated Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative%	Total	% of Variance	Cumulative %
1.	8.557	22.518	22.518	5.204	13.694	13.694
2.	2.531	6.661	29.179	4.697	12.362	26.056
3.	2.440	6.422	35.601	3.325	8.749	34.805
4.	2.379	6.260	41.861	2.681	7.056	41.861
5.	1.876	4.937	46.798			
6.	1.668	4.390	51.188			
7.	1.602	4.215	55.403			
8.	1.386	3.648	59.051			
9.	1.218	3.204	62.255			
10.	1.176	3.096	65.351			
11.	1.107	2.913	68.263			
12.	0.935	2.462	70.725			
13.	0.916	2.410	73.135			
14.	0.813	2.139	75.274			
15.	0.802	2.110	77.384			
16.	0.768	2.020	79.404			
17.	0.739	1.944	81.348			
18.	0.681	1.793	83.141			
19.	0.607	1.598	84.738			
20.	0.596	1.570	86.308			
21.	0.526	1.385	87.693			
22.	0.502	1.322	89.015			
23.	0.474	1.248	90.263			
24.	0.446	1.173	91.436			
25.	0.402	1.057	92.493			
26.	0.340	0.894	93.387			
27.	0.317	0.835	94.223			
28.	0.313	0.824	95.047			
29.	0.301	0.793	95.839			
30.	0.270	0.710	96.549			
31.	0.244	0.642	97.191			
32.	0.216	0.569	97.761			
33.	0.193	0.508	98.269			
34.	0.180	0.475	98.743			
35.	0.154	0.406	99.150			
36.	0.125	0.330	99.479			
37	0.116	0.305	99.784			
38.	8.191E-02	0.216	100.000			

same (41.861%) for both the *Initial Eigenvalues* and *Rotated Sums of Squared Loadings* columns, through factor number 4. This demonstrates that different percentages of variance in scores are explained by extracted factors following rotation but that total variance explained remains the same.

Scree plot. The result of the scree plot is shown in Figure 5. The eigenvalues are plotted along the vertical axis and the components along the horizontal axis. Where the eigenvalues drop sharply in magnitude and level out is the cut-off point for selecting the number of factors to extract. As can be seen in Figure 5, a distinctive drop in magnitude occurs after the fourth component. The scree plot further supports a four-factor solution to the data.

Rotated component matrix. The rotated component matrix for the pilot data is shown in Table 9. The factor loadings are the intercorrelations of items (rows) and the components (columns). Eight items loaded on the first component, with five items exceeding item-factor correlation coefficients of 0.600. These eight items were related to the construct of Job Demands and consisted of the following items:

1. *My job is mentally demanding.*
2. *Patients are brought to my department for treatment/tests when we are already busy.*
3. *The expectations regarding my work assignments are excessive.*
4. *I spend too much time trying to keep up with the work load.*
5. *My job is physically demanding.*
6. *We receive new patients in my department just before quitting time.*
7. *There is not sufficient time to take rest periods or meal breaks.*

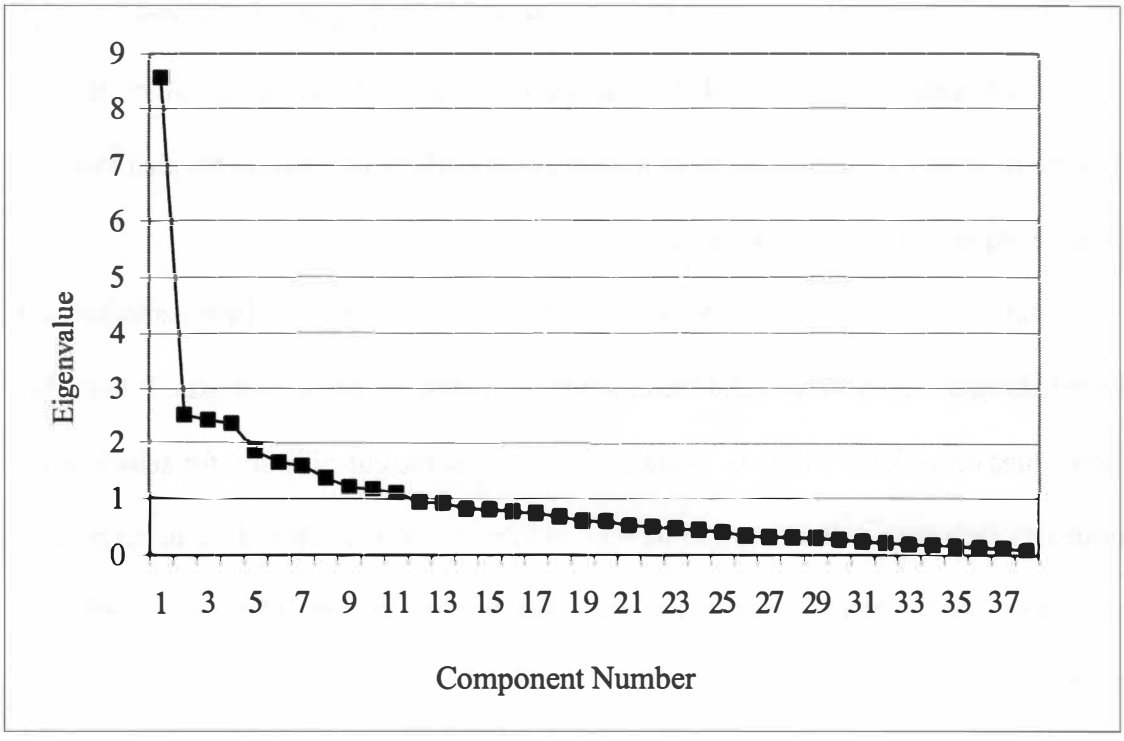

Figure 5. Scree plot of pilot study.

Table 9

Rotated Component Matrix for Pilot Study

Component				No.	Item
1	2	3	4		
0.712				37.	There is not sufficient time to take rest periods and meal breaks.
0.700				17.	The expectations regarding my assignments are excessive.
0.700				30.	My job is physically demanding.
0.601				15.	Patients are brought to my department for treatment/tests when we are already busy.
0.600				14.	My job is mentally demanding.
0.548				28.	I spend too much time trying to keep up with the workload.
0.532				6.	I am expected to work hard.
0.518				35.	We receive new patients in my department just before quitting time.
	0.755			9.	I experience conflicts with physicians.
	0.622			11.	I experience conflicts with coworkers.
	0.614			18.	Physicians are disrespectful.
	0.547			2.	I care for critically ill or injured patients who may die.
	0.537			20.	I supervise the assignments of others.
	0.519			3.	I am interrupted by telephone calls while performing tasks.

Table 9

Continued

Component				No.	Item
1	2	3	4		
		0.689		27.	My work places a great demand on my family.
		0.650		38.	I think about work when I prepare to go to sleep.
		0.595		12.	I am tired when I wake up.
		0.521		5.	I have to balance job demands and home demands.
			0.734	32.	I spend more time on accreditation or regulatory issues than taking care of patients.
			0.628	21.	I keep up with records required for accreditation or regulatory reasons.
			0.501	4.	I attend meetings required for accreditation of regulatory reasons.

8. *I am expected to work hard.*

The second component loaded with six items, with three containing intercorrelations above the 0.600 level. This grouping related to the construct of Interpersonal Conflicts, and were:

1. *I experience conflicts with physicians.*
2. *I experience conflicts with coworkers.*
3. *Physicians are disrespectful.*
4. *I care for critically ill or injured patients who may die.*
5. *I supervise the assignments of others.*
6. *I am interrupted by telephone calls while performing tasks.*

Four items loaded on the third component, with two items yielding correlation coefficients in excess of 0.600. These items were related to the construct of Work-Home Balance and included:

1. *I have to balance job demands and home demands.*
2. *I am tired when I wake up.*
3. *My work places a great demand on my family.*
4. *I think about work when I prepare to go to sleep.*

The final component was comprised of three items, with only one factor loading below 0.600. These three were related to the construct of Regulatory Complexity and consisted of the following:

1. *I attend meetings required for accreditation or regulatory reasons.*
2. *I keep up with records required for accreditation or regulatory reasons.*
3. *I spend more time on accreditation or regulatory issues than taking care of patients.*

A number of items were removed from the solution following factor analysis. These are summarized in Table 10.

Reliability of Pilot Data

Reliability was assessed by determining the Cronbach's alpha coefficient for the overall scale, as well as for each of the four factors. Cronbach's alpha coefficient is a gauge of the internal consistency among items, and higher scores suggest that the items are measuring the same thing. Table 11 provides the reliability values for the pilot instrument. With an overall coefficient alpha equal to 0.8854, it was apparent the HOSS showed high internal consistency among items.

Results of HCA Study

Based on the results of the pilot study, a 21-item, four-factor version of the HOSS was mailed to 3,000 employees of HCA subsidiary facilities in the United States. As described previously, these included 2,000 RNs, 500 pharmacists, and 500 radiologic technologists. The HOSS included a section requesting biographical information; however, HCA provided data such as age, race, gender, and employment status that resulted in the demographic section being shorter in length than anticipated. It was hypothesized that this would positively affect the response rate. The demographic data provided by HCA also afforded a mechanism to compare nonrespondents to respondents on those variables.

Descriptive Statistics

Of the 2,000 HOSS questionnaires mailed to RNs, 31 were damaged upon return by the postal service and 13 were completed and returned by employees who were not

Table 10

Items Removed from Solution Following Pilot Study

Number on Pilot Version	Item
1.	I experience conflicting demands on my job.
7.	I am not paid adequately for my work.
8.	I spend too much time entering items into the computer system.
10.	Employees quit my organization.
13.	I spend more time doing paperwork than taking care of patients.
16.	Efforts have been made by management to redesign my job .
19.	I am pressured to work overtime or past the end of my shift.
22.	I fear making a mistake on my job.
23.	I experience workplace politics on the job.
24.	There is low morale among employees.
25.	I am expected to work fast.
26.	I spend more time entering things into computer than taking care of patients.
29.	Insurance companies have more control over my patient's care than I do.
31.	Employees are absent or tardy.
33.	I deal with the death of patients.
34.	I have a hectic work schedule.
36.	There is a lack of communication between departments.

Table 11

Reliability Coefficients for Pilot Study

Factor	Label	Cronbach's alpha
1	Job Demands	0.8216
2	Interpersonal Conflicts	0.6521
3	Work-Home Balance	0.6847
4	Regulatory Complexity	0.6131
Total		0.8854

RNs. These 13 had apparently been miscoded by the employing facilities, and consisted largely of clerical personnel assigned to nursing units. Of the remaining 1,956 surveys, 748 were returned by RNs resulting in a response rate of 38.2%. Two employees returned the HOSS without completing it, resulting in 746 useable questionnaires.

While this response rate was lower than expected, it is comparable to that of Maurier and Northcutt (2000). They reported that 271 nurses out of 1,000 responded to their postal survey for a 27% return rate.

Of the 500 instruments mailed to pharmacists, 2 were damaged upon return by the postal service and 53 were completed and returned by employees who were not pharmacists. This high number of miscoded employees consisted primarily of pharmacy technicians who were unlicensed personnel providing assistance to pharmacists. Of the remaining 445 surveys, 93 were returned for a 29.3% response rate. Neither Schommer (2001) nor Wolfgang (1989) provided specific response rates for pharmacists in their studies.

The HOSS was mailed to 500 radiologic technologists. Ten clerical support personnel inadvertently received the surveys and completed them. Radiologic technologists completed 103 questionnaires for a 22.6% response rate. This was similar to the response rate obtained by Frazer and Sechrist (1994), who reported a 20.5% response rate from radiologic technologists using a postal questionnaire.

Based on the 3,000 mailed HOSS questionnaires, the 942 useable returns yielded a response rate of 31.4% for the overall study. Questionnaires from 33 participants could not be used due to being damaged, presumably by postal equipment. A few more instruments were partially damaged but usable.

Two surveys were returned in good order but left blank by the intended recipients. Also, a large number of those sampled (n = 74) had been miscoded as RNs, pharmacists, and radiologic technologists, and these were excluded from the study. Cydulka et al. (1997) likewise mailed questionnaires to 3,000 workers in their national study of occupational stress. With a response rate of 22%, their findings were based on data from 658 participants. Lyne et al. (2000) also reported a response rate of 22% for their healthcare sample.

The number of females responding was 825 or 87.1%. This was consistent with the findings of Cangelosi et al. (1998), Niven and Knussen (1999), Evers et al. (2000) and Lyne et al. (2000) who each reported response rates for females of 80% or higher. According to the American Hospital Association (AHA, 2002), females account for 93.1% of all RNs.

The number of whites responding was 795 or 84% of the respondents. Fifty-two (52) were African American, for a 5.5% participation rate. Asian Americans accounted for 6.4% of those responding (n = 61), while the response rate for Hispanics was 4% (n = 38). The AHA (2002) confirmed that racial minorities are underrepresented in the health care workforce. They reported that 4.9% of RNs are African American, and 2% are Hispanic (p. 47). Ethnic and racial data in occupational stress studies were scarce. Mesch et al. (1999) reported that 54% of the employees in their study were white.

The number of respondents by age category was almost identical for the 36 to 45 and 46 to 55 range. The 36 to 45 range applied to 295 respondents (31.2%), while 297 were in the 46 to 45 category (31.4%). Nearly one-fourth (24.4%) reported being in the 26 to 35 age category. The actual mean age of all respondents was 43.0 years.

This was consistent with Hemingway and Smith (1999) who reported a mean age of 42 years. Niven and Knussen (1999) reported an average age of 37 years, while Mesch et al. (1999) studied a slightly older population at 46 years of age. Yet De Jonge, Van Breukelen, et al. (1999), De Rijk et al. (1998), and Hillhouse and Adler (1997) reported mean ages in the 30s. The average age of health professionals is increasing, consistent with the general population. According to the AHA (2002), the average age of RNs rose to 47 years in 2000. Table 12 provides a summary of selected demographic variables for the HCA study.

Married employees accounted for 70.5% of respondents ($n = 663$). Single and divorced employees represented 27.8% of respondents ($n = 161$). These were consistent with Hemingway and Smith (1999) and Cheng et al. (2000), who reported response rates from married participants of 71% and 81.7%, respectively. Married respondents in the study by Ogus (1995) represented only 41% of the population.

Almost two-thirds (65.6%) of participants reported working on first shift ($n = 609$). First shift consists primarily of hours that occur during the daytime, although a worker could begin or end his or her shift in the dark. HCA facilities often employ 12-hour shifts, which are quite common in healthcare (Brooks, 2000). In situations where 12-hour shifts are used, the corresponding crew works third shift, which consists primarily of hours that occur during the nighttime. For the present study, 23.4% worked third shift ($n = 217$). This 12-hour phenomenon resulted in only 11% of respondents reporting second shift as their primary schedule ($n = 102$). Second shift is used when the organization employs a traditional three-shift approach to staffing. Rees (1995) reported that 88% of respondents in his study worked on first shift.

Table 12

Selected Demographics for HCA Study

Variable and Level of Responses	Frequency	Percent	Cumulative Percent
Title			
RN	746	78.8%	78.7%
Pharmacist	93	9.8%	88.6%
Radiologic technologist	103	10.9%	99.5%
Missing value	5	0.5%	100.0%
Total	947	100.0%	
Gender			
Female	825	87.1%	87.1%
Male	122	12.9%	100.0%
Total	947	100.0%	
Race			
African American	52	5.5%	5.5%
White	795	83.9%	89.4%
Hispanic	38	4.0%	93.4%
Asian American	61	6.5%	99.9%
Other	0	0.0%	99.9%
Missing value	1	0.1%	100.0%
Total	947	100.0%	
Age Category			
< 25 years	18	1.9%	1.9%
26 – 35 years	231	24.4%	29.5%
36 – 45 years	295	31.2%	54.3%
46 – 55 years	297	31.4%	86.0%
> 55	106	11.1%	98.4%
Total	947		100.0%

Education level for participants was predictable. An associate degree in nursing was reported by 32.6% of respondents (n = 306), and 28.9% had earned a baccalaureate degree in nursing (n = 272). Other categories included 8.6% with having an associate degree in another field (n = 81). Of these, 76 were radiologic technologists. A baccalaureate degree in a non-nursing field was reported by 9.5% of respondents (n = 89). Of these, 53 were pharmacists.

Cheng et al. (2000) found 85.2% of participants reported having associate or baccalaureate degrees, while 14.4% reported having graduate degrees. In the study by Taunton et al. (1997), 47.6% had baccalaureate or graduate degrees. Erlen and Sereika (1997) reported that 49.2% of respondents in their study had baccalaureate degrees.

In terms of length of service with the organization, 51.1% had been employed between 2 and 10 years (n = 478). Similarly, 51.6% had been in the same position for 2 to 10 years (n = 481). Taunton et al. (1997) reported means of 10 years in the profession and 4.2 years on the job. An average of 11.2 years in the organization and 4.7 years in the position was found by Hillhouse and Adler (1997). A length of service of 6 years was reported by De Jonge, Mulder, et al. (1999) and De Rijk et al. (1998).

Support received from one's supervisor was medium or high for 73% of respondents (n = 687). Support received from staff assigned to supporting roles was medium or high according to 89.7% (n = 829.) Most employees (524) reported between 3 and 5 persons in their household (55.9%). Two-person families accounted for 30.2% of those responding (n = 283).

With respect to geographical response, 242 participants were from Florida (25.5%) and 169 were from Texas (17.8%). This was expected in that a majority of

HCA's subsidiary hospitals are located in the Southern United States. Table 2 provides the states in which respondents were living at the time they completed the HOSS.

Table 13 shows the mean scores and standard deviations for each of the 21 items on the HOSS mailed to HCA recipients. The highest mean score reported (5.86) was for item 9, *My job is mentally demanding.* The lowest mean score (2.99) was reported for item 7, *I experience conflicts with coworkers.* The lowest mean score on the pilot version of the HOSS was also for this item.

The three items measuring turnover cognition indicated that respondents had thought about finding better jobs, but most had not made specific plans to do so. For the item *in the next twelve months I plan to seek employment with a different organization*, more than two-thirds (73.3%) gave a neutral response or disagreed. Of these, 282 employees marked *strongly disagree* (30%). Of those who did identify with the statement, 11.7% indicated *strongly agree* ($n = 110$). Registered nurses accounted for 220 of those who disagreed, and 95 of those who strongly agreed (see Figure 6).

By contrast, most respondents (53.4%) agreed with the item *if I could find a better job I would quit my organization.* The anchor *strongly agree* was marked by 267 employees (28.5%), and 207 of these were RNs. Among those who did not indicate specific agreement, most (22%) were, at best, neutral regarding the statement (see Figure 7).

As summarized in Figure 8, the majority of those responding (68.4%) agreed with the item *employees quit my organization* ($n = 641$). *Strongly agree* was indicated by 29.7% ($n = 278$). Of these, 222 were RNs.

Table 13

Mean Scores and Standard Deviations for HCA Study

No.	Mean	Standard Deviation	Item
1.	4.40	1.793	I care for critically ill or injured patients who may die.
2.	5.13	1.597	I am interrupted by telephone calls while performing tasks.
3.	5.10	1.801	I attend meetings required for accreditation or regulatory reasons.
4.	5.72	1.540	I have to balance job demands and home demands.
5.	6.50	0.842	I am expected to work hard.
6.	3.34	1.431	I experience conflicts with physicians.
7.	2.99	1.290	I experience conflicts with coworkers.
8.	4.55	1.548	I am tired when I wake up.
9.	5.86	1.226	My job is mentally demanding.
10.	5.03	1.779	Patients are brought to my department for treatment/tests when we are already busy.
11.	4.58	1.536	The expectations regarding my work assignments are excessive.
12.	3.27	1.403	Physicians are disrespectful.
13.	4.01	1.877	I supervise the assignments of others.
14.	5.12	2.064	I keep up with records required for accreditation or regulatory reasons.
15.	3.95	1.638	My work places a great demand on my family.
16.	4.36	1.563	I spend too much time trying to keep up with the work load.
17.	5.12	1.593	My job is physically demanding.
18.	3.11	1.670	I spend more time on accreditation or regulatory issues than taking care of patients.
19.	4.90	1.693	We receive new patients in my department just before quitting time.
20.	5.01	1.574	There is not sufficient time to take rest periods or meal breaks.
21.	4.17	1.721	I think about work when I prepare to go to sleep.

Note. The range for all items was 1 to 7.

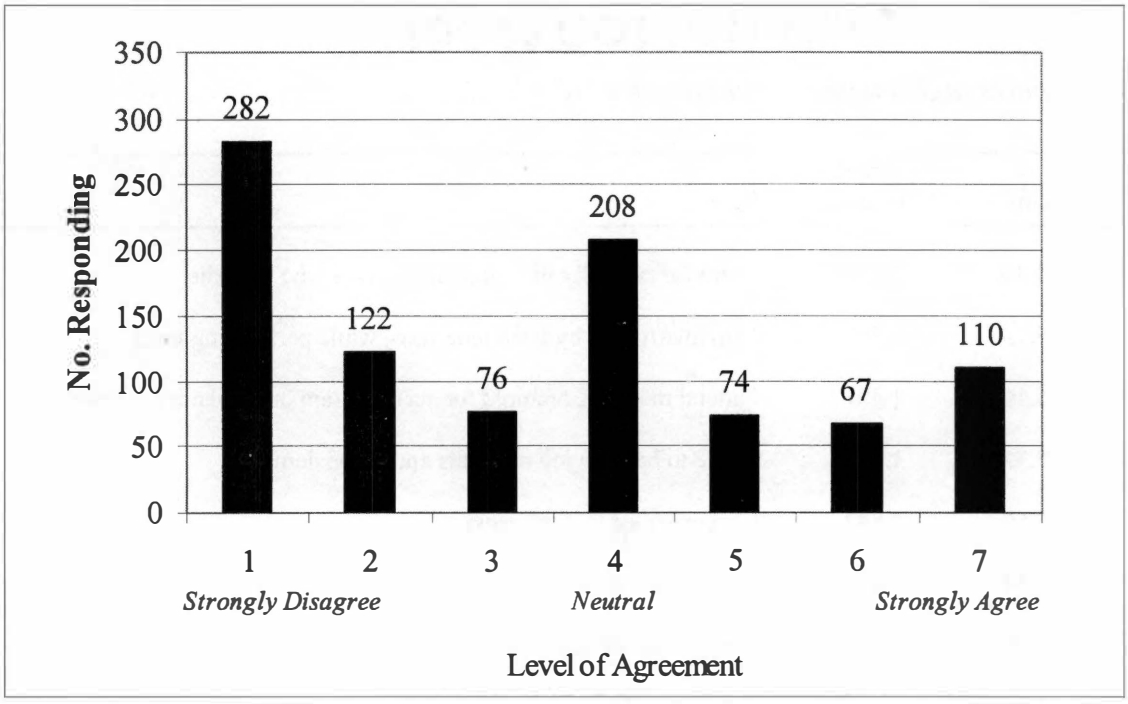

Figure 6. Histogram of number of respondents by level of agreement for the item *in the next twelve months I plan to seek employment with a different organization.*

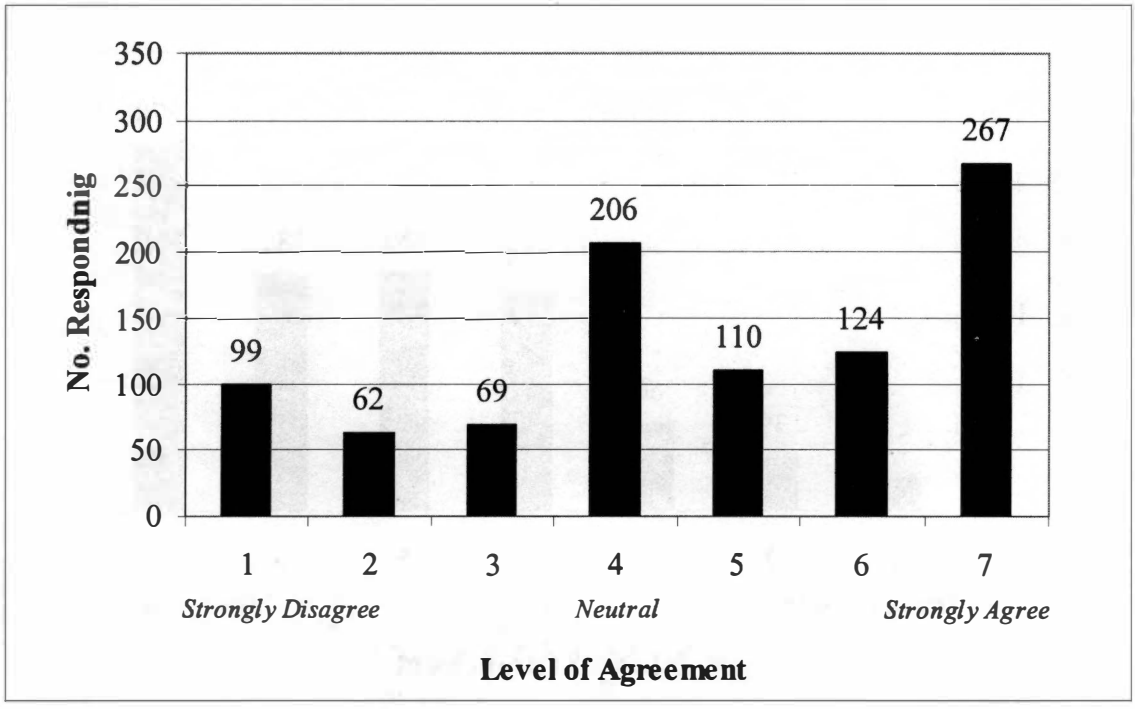

Figure 7. Histogram of number of respondents by level of agreement for the item *if I could find a better job I would quit my organization.*

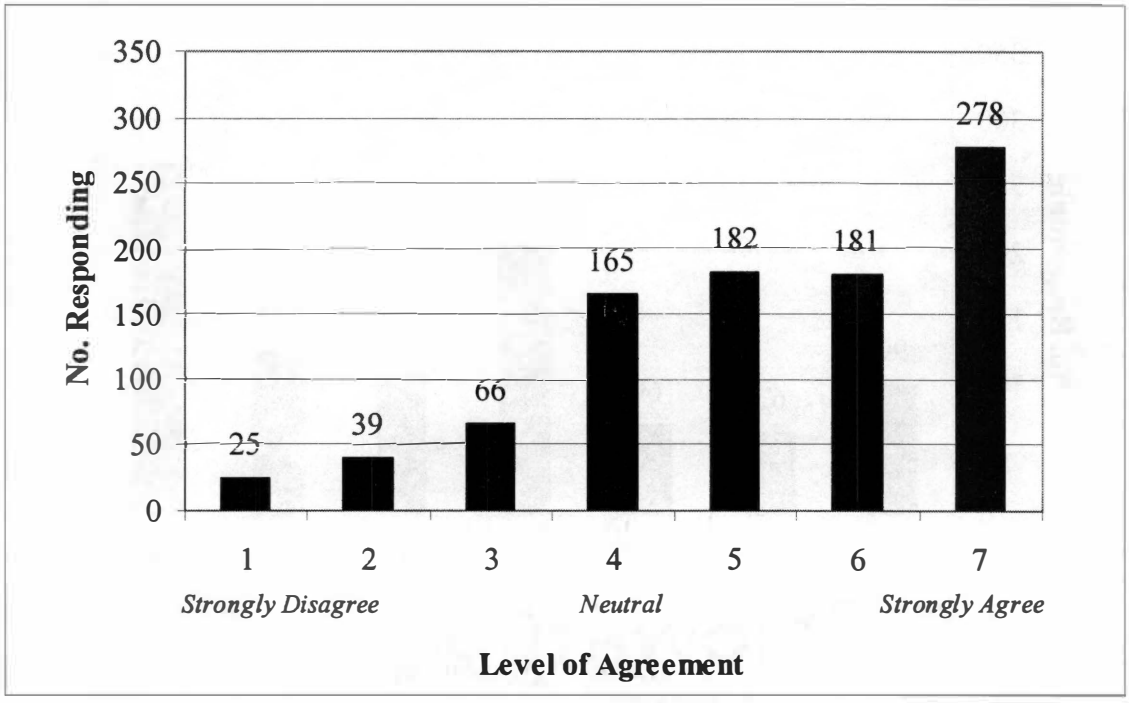

Figure 8. Histogram of the number of respondents by level of agreement for the item *employees quit my organization.*

Factor Analysis

Principal components analysis was performed on the HCA data using SPSS for Windows (SPSS, Inc., Chicago, Illinois), version 10.1.0. A varimax rotation with Kaiser normalization was used. An 18-item, four-factor model provided the most interpretable solution and this formed the basis of the final instrument.

Total variance explained. Table 14 provides the total variance explained by the four-factor model for the HCA study. In this case it was 49.06%. The table is in the same format as that of the pilot data. Twenty-one factors are shown, but only the first four are extracted because the solution yielded no cross loadings on any of the items. Low eigenvalues indicated that the factor contributed little to the explanation of the variance between scores on the instrument.

As with the pilot data, the *Rotated Sums of Squared Loadings* column of Table 14 lists only the factors extracted for the model. The cumulative percent of variance explained by the model is identical (49.06%) for both the *Initial Eigenvalues* and *Rotated Sums of Squared Loadings* columns, through factor number 4. The eigenvalues in this column were a result of factor rotation and improved the interpretability of the factors. Total variance in the model remained the same even though different percentages of variance in scores were explained by extracted factors following rotation.

Scree plot. The scree plot of the HCA data is shown in Figure 9. The vertical axis shows the eigenvalues and the components are plotted along the horizontal axis. A clear and distinctive decrease in magnitude occurred after the fourth component. Consequently, the scree plot supported the four-factor solution to the data.

Table 14

Total Variance Explained for HCA Study

	Initial Eigenvalues			Rotated Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1.	5.987	28.508	28.508	3.795	18.071	18.071
2.	1.563	7.441	35.949	2.358	11.231	29.302
3.	1.441	6.863	42.812	2.255	10.738	40.040
4.	1.312	6.250	49.062	1.895	9.022	49.062
5.	1.083	5.158	54.219			
6.	1.028	4.896	59.115			
7.	0.883	4.203	63.318			
8.	0.803	3.825	67.143			
9.	0.769	3.660	70.802			
10.	0.721	3.433	74.235			
11.	0.679	3.235	77.470			
12.	0.638	3.037	80.506			
13.	0.590	2.807	83.314			
14.	0.579	2.758	86.071			
15.	0.534	2.541	88.613			
16.	0.511	2.434	91.047			
17.	0.471	2.241	93.288			
18.	0.414	1.971	95.258			
19.	0.373	1.777	97.036			
20	0.331	1.577	98.613			
21.	0.291	1.387	100.000			

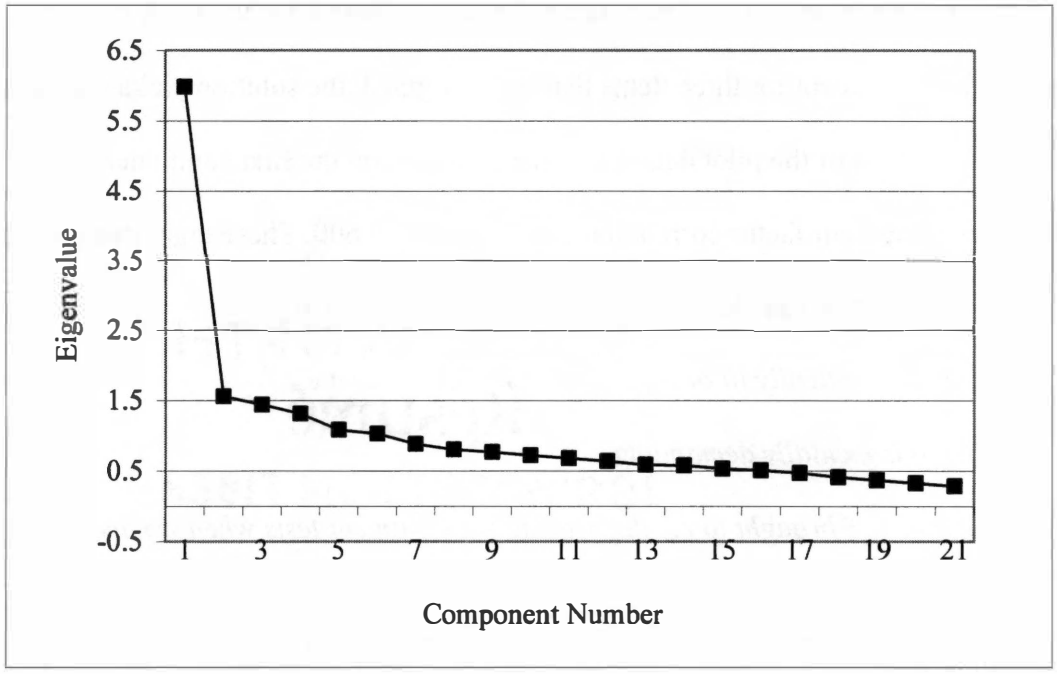

Figure 9. Scree plot of HCA study.

Rotated component matrix. The rotated component matrix for the HCA data is shown in Table 15. Except for three items that were dropped, the solution yielded almost identical results as that of the pilot data. Eight items loaded on the first component, with five items exceeding item-factor correlation coefficients of 0.600. These eight items were related to the construct of Job Demands, and included the following:

1. *I care for critically ill or injured patients who may die.*
2. *My job is mentally demanding.*
3. *Patients are brought to my department for treatment/tests when we are already busy.*
4. *The expectations regarding my work assignments are excessive.*
5. *I spend too much time trying to keep up with the work load.*
6. *My job is physically demanding.*
7. *We receive new patients in my department just before quitting time.*
8. *There is not sufficient time to take rest periods or meal breaks.*

The second component loaded with three items, each with intercorrelations above the 0.600 level. These related to Interpersonal Conflicts, and were as follows:

1. *I experience conflicts with physicians.*
2. *I experience conflicts with coworkers.*
3. *Physicians are disrespectful.*

The factor loading for *I experience conflicts with physicians* was 0.828, the highest intercorrelation on the instrument.

Three items loaded on the third component, with two yielding correlation coefficients in excess of 0.600. These were related to the construct of *work-home balance* and consisted of the following:

Table 15

Rotated Component Matrix for HCA Study

Component				No.	Item
1	2	3	4		
0.711				17.	My job is physically demanding.
0.692				10.	Patients are brought to my department for treatment/tests when we are already busy.
0.661				19.	We receive new patients in my department just before quitting time.
0.648				11.	The expectations regarding my work assignment are excessive.
0.647				20.	There is not sufficient time to take rest periods or meal breaks.
0.591				9.	My job is mentally demanding.
0.534				16.	I spend too much time trying to keep up with the work load.
0.515				1.	I care for critically ill or injured patients who may die.
	0.828			6.	I experience conflicts with physicians.
	0.755			12.	Physicians are disrespectful.
	0.664			7.	I experience conflicts with coworkers.
		0.691		15.	My work places a great demand on my family.
		0.684		4.	I have to balance job demands and home demands.

Table 15

Rotated Component Matrix for HCA Study

Component					
1	2	3	4	No.	Item
		0.571		8.	I am tired when I wake up.
			0.739	14.	I keep up with records required for accreditation or regulatory issues.
			0.656	3.	I attend meetings required for accreditation or regulatory reasons.
			0.539	13.	I supervise the assignments of others.
			0.513	18.	I spend more time on accreditation or regulatory issues than taking care of patients.

1. *I have to balance job demands and home demands.*
2. *I am tired when I wake up.*
3. *My work places a great demand on my family.*

The final component was comprised of four items, with two factor loadings above 0.600. These were related to the Regulatory Complexity construct, and consisted of the following items:

1. *I attend meetings required for accreditation or regulatory reasons.*
2. *I supervise the assignments of others.*
3. *I keep up with records required for accreditation or regulatory reasons.*
4. *I spend more time on accreditation or regulatory issues than taking care of patients.*

Three items included in the pilot data were dropped as a result of the factor analysis on the HCA data. These were:

1. *I am interrupted by telephone calls while performing tasks*, which was part of the Job Demands subscale on the pilot version.
2. *I am expected to work hard*, also from the Job Demands subscale.
3. *I think about work when I prepare to go to sleep*, from the Work-Home Balance factor on the pilot version.

A comparison of the factor structure for the pilot and HCA data is presented in Table 16.

Reliability of HCA Data

A Cronbach's alpha coefficient was determined to assess reliability for the overall scale and each of the four factors. Table 17 provides the reliability values for the HCA data. With a coefficient alpha equal to 0.8601, the final version of the HOSS showed high internal consistency and that the items were measuring the same constructs.

Table 16

Comparison of Factor Structure – Pilot vs. HCA Study

Pilot Study Subscale	Item	HCA Study Subscale
Job Demands	There is not sufficient time to take rest periods and meal breaks.	Job Demands
Job Demands	The expectations regarding my assignments are excessive.	Job Demands
Job Demands	My job is physically demanding.	Job Demands
Job Demands	Patients are brought to my department for treatment/tests when we are already busy.	Job Demands
Job Demands	My job is mentally demanding.	Job Demands
Job Demands	I spend too much time trying to keep up with the workload.	Job Demands
Job Demands	I am expected to work hard.	N/A[a]
Job Demands	We receive new patients in my department just before quitting time.	Job Demands
Interpersonal Conflicts	I experience conflicts with physicians.	Interpersonal Conflicts
Interpersonal Conflicts	I experience conflicts with coworkers.	Interpersonal Conflicts
Interpersonal Conflicts	Physicians are disrespectful.	Interpersonal Conflicts
Interpersonal Conflicts	I care for critically ill or injured patients who may die.	Job Demands

Table 16

Continued

Pilot Study Subscale	Item	HCA Study Subscale
Interpersonal Conflicts	I supervise the assignments of others.	Regulatory Complexity
Interpersonal Conflicts	I am interrupted by telephone calls while performing tasks.	N/A[a]
Home-Work Balance	My work places a great demand on my family.	Home-Work Balance
Home-Work Balance	I think about work when I prepare to go to sleep.	N/A[a]
Home-Work Balance	I am tired when I wake up.	Home-Work Balance
Home-Work Balance	I have to balance job demands and home demands.	Home-Work Balance
Regulatory Complexity	I spend more time on accreditation or regulatory issues than taking care of patients.	Regulatory Complexity
Regulatory Complexity	I keep up with records required for accreditation or regulatory reasons.	Regulatory Complexity
Regulatory Complexity	I attend meetings required for accreditation of regulatory reasons.	Regulatory Complexity

[a]These items were dropped from the instrument as a result of the HCA study.

Table 17

Reliability Coefficients for HCA Study

Factor	Label	Cronbach's alpha
1	Job Demands	0.8276
2	Interpersonal Conflicts	0.7373
3	Work-Home Balance	0.6176
4	Regulatory Complexity	0.5609
Total		0.8601

This compares favorably to other stress research and instrument development studies. Gueritault-Chavin et al. (2000), for example, reported an internal consistency coefficient for the MBI of 0.88. The MBI, developed by Maslach and Jackson (1981), is a well-established instrument in research. When Gray-Toft and Anderson (1981) published the NSS, they reported an internal consistency 0.89 for the total instrument.

For the eight-item Job Demands factor, the reliability coefficient was 0.826. A coefficient alpha of 0.7373 was determined for the Interpersonal Conflicts factor. Reliability for the Work-Home Balance factor was 0.6176, and for the Regulatory Complexity factor the coefficient of determination was 0.5609. These latter two coefficients were lower than the overall HOSS reliability measure, but the factors contained only a few items to measure.

Comparison of Respondents and Nonrespondents

HCA provided much of the demographic data that permitted this section of the instrument to be shortened. These also made it possible to compare respondents with nonrespondents on the given variables. A chi-square test for independence was conducted on the categories of job title, gender, race, age, employment status, years with the organization, and department. Table 18 provides the chi-square test results for each categorical variable.

With the exception of employment status, there were significant differences between the respondents and nonrespondents. The results of the chi-square test indicated that the respondent and nonrespondent groups were statistically independent and therefore different. The implications for the present study were that generalizability of the data to other populations is limited. It should be noted, however, that the variance

Table 18

Chi-Square Test for Independence on Nonrespondents

Category	χ^2	*df*	*N*	*p*
Job Title	71.576	2	2,918	0.000
Gender	15.853	1	2,923	0.000
Race	53.998	4	2,919	0.000
Age	43.130	4	2,923	0.000
Employment Status	4.1560	3	2,923	0.122
Years with Organization	76.893	5	2,911	0.000
Department	71.487	17	2,770	0.000

between observed and expected counts was not that high in several categories. Given that employees were randomly selected for the study, the differences between the sample and the population should only occur by chance.

With respect to age, for example, the observed count for nonrespondents in the 26 to 35 year range was 494 and the expected count was 490.1. Similarly, the observed count for respondents in this age range was 231 and the expected count was 234.9. The same phenomenon occurred for other age ranges. In terms of gender, the variance between observed and expected counts on nonrespondent females was 37.7. Given a total observed count of 2,923 for this category, this difference is not high. Table 19 provides the observed and expected cases for each variable, except for department due to the large number of cells.

Research Questions

Research Question 1: What are the Common Factors of Occupational Stress in Healthcare Employees?

Based on the factor analysis conducted on the HCA data, the common factors of occupational stress in healthcare employees were as follows:

1. Job Demands.
2. Interpersonal Conflicts.
3. Home-work Balance.
4. Regulatory Complexity.

Job Demands consisted of eight items; Interpersonal Conflicts consisted of three; Home-Work Balance contained three items; and Regulatory Complexity consisted of four. These are summarized in Appendix L. Overall, the final instrument contained 18 items

Table 19

Observed and Expected Cases for Respondents and Nonrespondents

	Nonrespondents		Respondents	
Category	Observed	Expected	Observed	Expected
Job Title				
Registered Nurse	1,258	1,357.1	746	646.9
Pharmacist	349	299.3	93	142.7
Radiologic Technologist	369	319.6	103	152.4
Gender				
Female	1,605	1,642.7	825	787.3
Male	371	333.3	122	159.7
Race				
African American	229	189.9	52	91.1
White	1,429	1,503.2	795	720.8
Hispanic	141	121.0	38	58.0
Asian American	164	152.1	61	72.9
Other	10	6.8	0	3.2
Age				
< 25 Years	146	110.9	18	53.1
26-35 Years	494	490.1	231	234.9
36-45 Years	634	628.0	295	301.0
46-55 Years	524	555.0	297	266.0
> 55 Years	178	192.0	106	92.0
Employment Status				
Full Time	1,266	1,245.9	577	597.1
Part Time	145	156.2	86	74.8
PRN[a]	559	568.5	282	272.2
Years with Organization				
< = 1 Year	577	494.8	152	234.2
2-5 Years	661	662.5	315	313.5
6-10 Years	314	323.8	163	153.2
11-20 Years	305	346.9	206	164.1
21-30 Years	103	129.0	87	61.0
> 30 Years	16	19.0	12	9.0

[a]From the Latin *pro re nata*, or *as needed*, originally applied to medication and treatment orders, but in recent years to a casual or flexible employment arrangement.

and an internal consistency coefficient of 0.861. Evidence of content validity was established by use of a Delphi panel in the instrument development phase.

Research Question 2: Did Exploratory Factor Analysis of Items From the HOSS Identify Latent Constructs Consistent With Theory?

Job demands. The construct of job demands in the context of occupational stress research is attributed chiefly to Karasek (1979) and his theories established the conceptual framework for the present study. A number of studies provide support for the job demands construct. In the investigation by Cheng et al. (2000), female nurses with scores in the highest third of job demands and lowest third of decision latitude, as measured by the JCQ (Karasek et al., 1998), had the worst scores on physical functioning and mental health.

De Jonge, Van Breukelen, et al. (1999) found that job demands were associated with emotional exhaustion and anxiety. According to De Jonge, Mulder, et al. (1999), job demands were related to job satisfaction and job involvement. De Rijk et al. (1998) found an association between job demands and active coping, and a three-way interaction effect for job demands, job control, and active coping.

Interpersonal conflicts. The latent construct of interpersonal conflicts was identified in other studies of occupational stress in healthcare. In the cluster analysis conducted by Hillhouse and Adler (1997), one group of nurses reported a greater incidence of conflicts with peers and physicians. Sella and Macleod (1995) reported that job satisfaction was affected by the conflicts associated with the handover between shifts in healthcare settings. Gupchup and Wolfgang (1994) labeled a subscale *job conflicts* on their factor analysis of the HPSI (Wolfgang, 1988).

Home-work balance. The interface between one's life at home, such as family relationships, and work is a common construct in occupational stress research. Cooper and Mitchell (1990) and Rees (1995) measured the effects of stress on the relationship between home and work. The OSI (Cooper et al., 1988) contained a subscale for the interface between home and work. Likewise, Harris (1989) added a similar subscale for the NSI.

Regulatory complexity. At the time the present study was conducted, no empirical research was available on occupational stress related to accreditation by the JCAHO or maintaining compliance with the numerous and complicated rules of other regulatory bodies and payors. This is an opportunity for continued investigation by researchers. However, the notion of regulatory complexity was evident in the industry. Firely and Walter (2002), Malila and Kotal (1993), Meyer et al. (1996), and Nettleman (1995) reported on the fear, anxiety, and stress associated with preparing for a JCAHO accreditation survey and maintaining a constant state of preparedness.

Research Question 3: Did Exploratory Factor Analysis of an Instrument Measuring Stress in Healthcare Occupations Result in an Interpretable Factor Structure of Constructs?

An exploratory factor analysis of an instrument measuring stress in healthcare occupations resulted in an interpretable factor structure of constructs. The rotated component matrix for the HCA data, as measured by the HOSS, is presented in Table 15 and described in detail under Research Question 1 above. The fact that there were no cross loadings on any of the items made the factor structure readily interpretable. When each item loads on only one factor, the criteria for simple structure is satisfied, according

to DeVellis (1991) and Nunnally (1978).

Given that all intercorrelations exceeded 0.50, each item correlated at least moderately with a given factor. Of the 18 items in the final model, 12 had intercorrelations above 0.600. These higher loadings indicated a strong correlation between the item and the factor.

Given the statistical differences between the respondents and nonrespondents, less congruence on the factors across three employee occupations might have been anticipated. The findings, however, consisted of strong item-factor correlations, no cross loadings, and no confounding variables.

Research Question 4: Which Occupational Group Experienced Higher Levels of Stress on Each Factor?

The following scale was provided to respondents on which to rate each item's frequency of occurrence: (a) never, (b) rarely, (c) occasionally, (d) half of the time, (e) frequently, (f) almost always, and (g) always.

Job demands. Of the three professions represented in the study, the RNs scored higher on the first factor, Job Demands, with a mean of 5.011. Corresponding to *frequently* on the scale, this was the highest mean score on any of the factors for any group. This was consistent with the findings of Rees (1995), who reported that pressure *intrinsic to the job* (i.e., job demands) was higher for the 430 hospital-based nurses in his study when compared to those responding from other professions.

Registered Nurses provide constant care to patients in the bustling milieu of the typical nursing unit. For the present study, radiologic technologists followed with a mean score of 4.860, then pharmacists with an average rating of 4.092. The mean score for all

respondents on Job Demands was 4.9034. Figure 10 provides a comparison of means on the Job Demands factor.

Interpersonal conflicts. On the second factor, Interpersonal Conflicts, no occupational group scored very high. The mean score for radiologic technologists was the highest at 3.573, corresponding to *occasionally* on the scale, followed by RNs with a mean of 3.187 and pharmacists at 2.912. The limited research on this phenomenon is conflicting.

Rees (1995) reported that the group including radiologic technologists had lower scores in this category. Frazer and Sechrist (1994) found disrespectful physicians and lack of respect being among the highest stressors for radiologic technologists. These people are trained to operate advanced imaging equipment used in diagnosis and treatment. It may be that radiologic technologists have greater opportunities to interact with peers and physicians, in this case radiologists, regarding the quality or interpretation of their radiographic studies. The mean score for all respondents on Interpersonal Conflicts was 3.2028. Figure 11 provides a comparison of mean scores for Interpersonal Conflicts.

Home-work balance. Factor three, Home-Work Balance, was rated highest by radiologic technologists with a mean score of 4.939. This was followed by RNs at 4.752, then pharmacists at 4.430. These scores corresponded to the rating *half of the time.* In the study by Rees (1995), radiologic technologists did not rate this stressor as high as other occupational groups. When compared to RNs and pharmacists, radiologic technologists are subject to a higher probability of being placed in an *on-call* status, in which they are called back to the worksite to conduct diagnostic procedures after normal working hours.

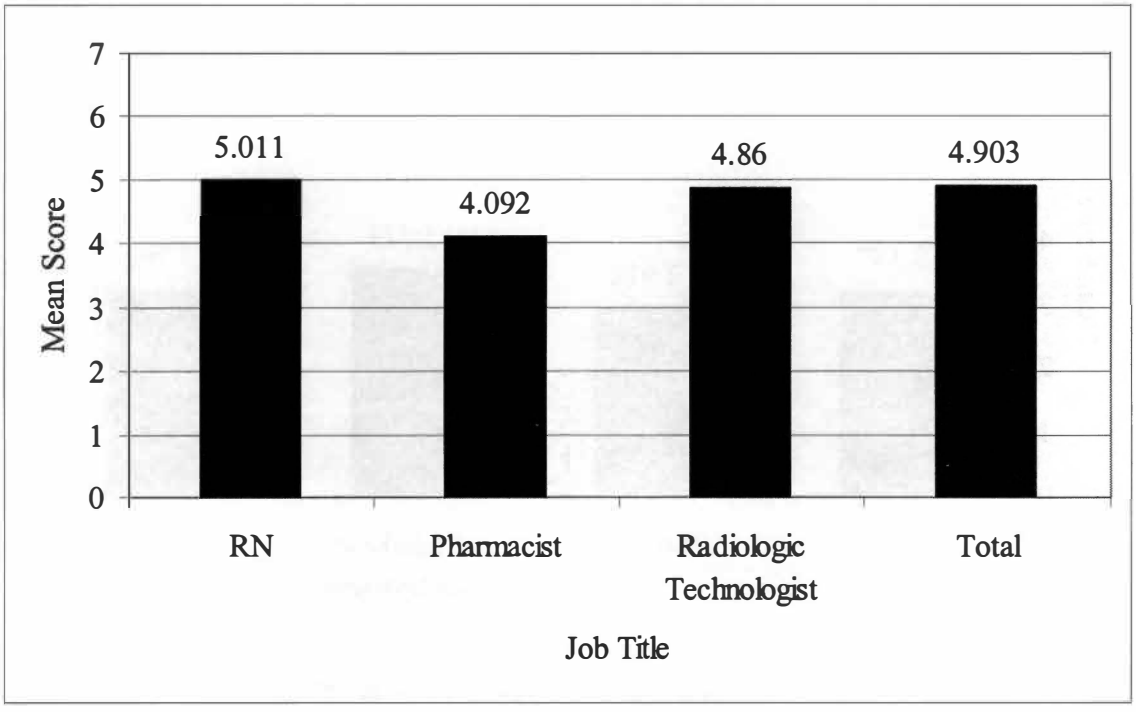

Figure 10. Histogram of Job Demands mean scores by job title.

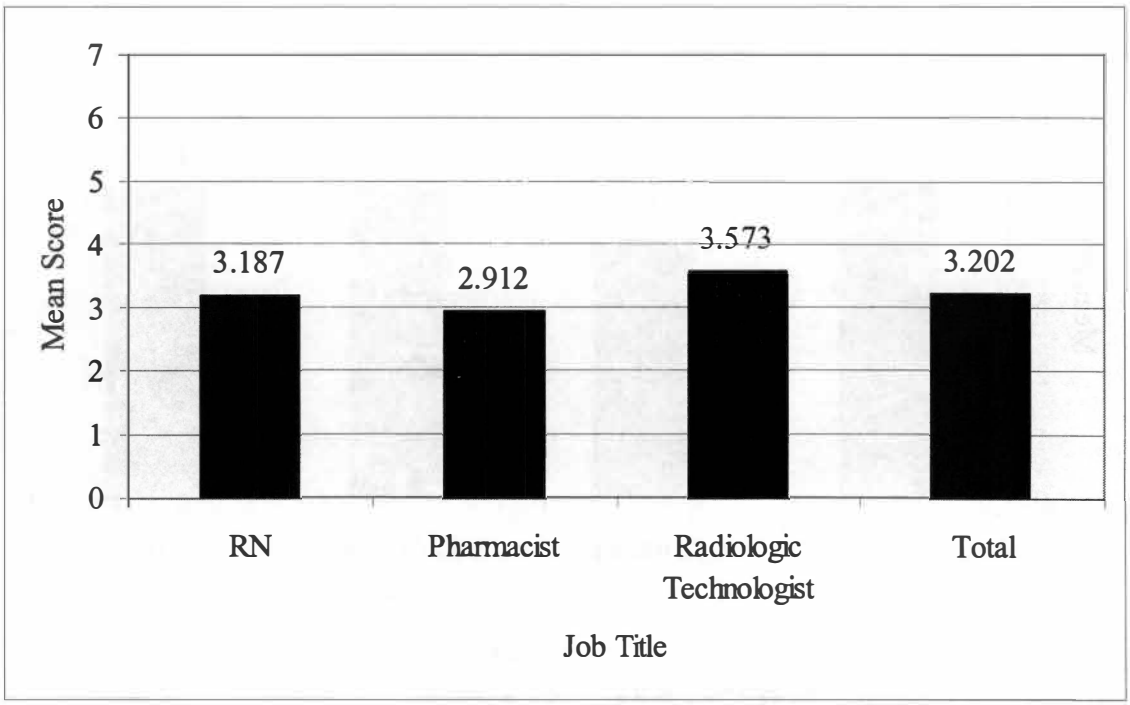

Figure 11. Histogram of Interpersonal Conflicts mean scores by job title.

For example, the manager may compensate radiologic technologists a flat on-call rate per shift, require the on-call employee to carry a pager and to respond within 30 minutes of being paged, after which the worker reports for duty and operates the necessary equipment at the request of the ordering physician. In this manner the department does not have to be staffed around the clock and personnel are only called in to work when required by a medical emergency. Erratic on-call schedules can negatively affect sleep patterns and create hardships on one's family. The mean score for all respondents on Home-Work Balance was 4.7427 (see Figure 12).

Regulatory complexity. On the fourth factor, Regulatory Complexity, the mean score for RNs was 4.379. This was followed by pharmacists with a mean of 4.173 and radiologic technologists with an average score of 4.134. This was the only factor on which the pharmacists did not have the lowest group mean. These scores correspond to a *half of the time* rating and are presented in Figure 13.

While JCAHO surveys encompass the entire workforce, and the review format is based on a multidisciplinary perspective, the focus is on patient outcomes tied directly to nursing care. One member of the JCAHO survey team is an RN, and the nursing division has its own set of rigorous standards that must be met (JCAHO, 2002). As a group, staff and supervisory-level RNs bear the brunt of JCAHO accreditation preparedness (Firely & Walter, 2002; Malila & Kotal, 1993; Meyer et al., 1996; Nettleman, 1995). The mean score for all respondents on Regulatory Complexity was 4.3320 (see Figure 13).

Overall occupational stress scores. The data from the HCA population indicated that employees were experiencing stressful situations about one-half of the time. The mean score on the HOSS for all respondents was 4.758. For RNs, a mean of 4.630 was

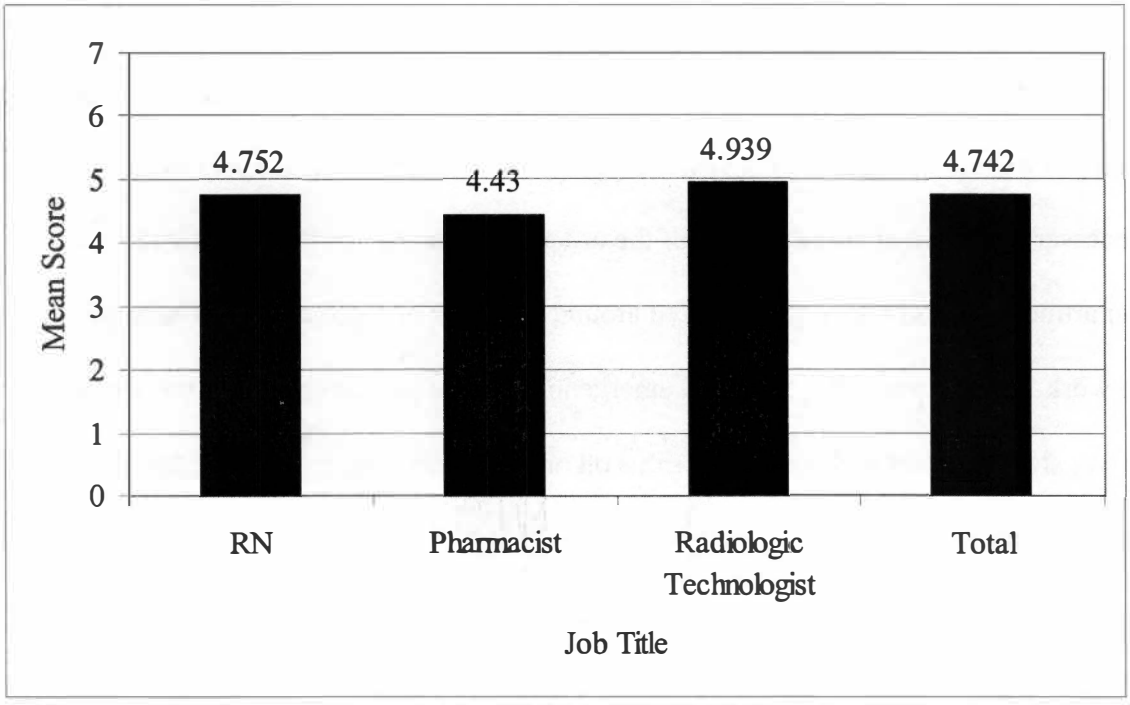

Figure 12. Histogram of Home-Work Balance mean scores by job title.

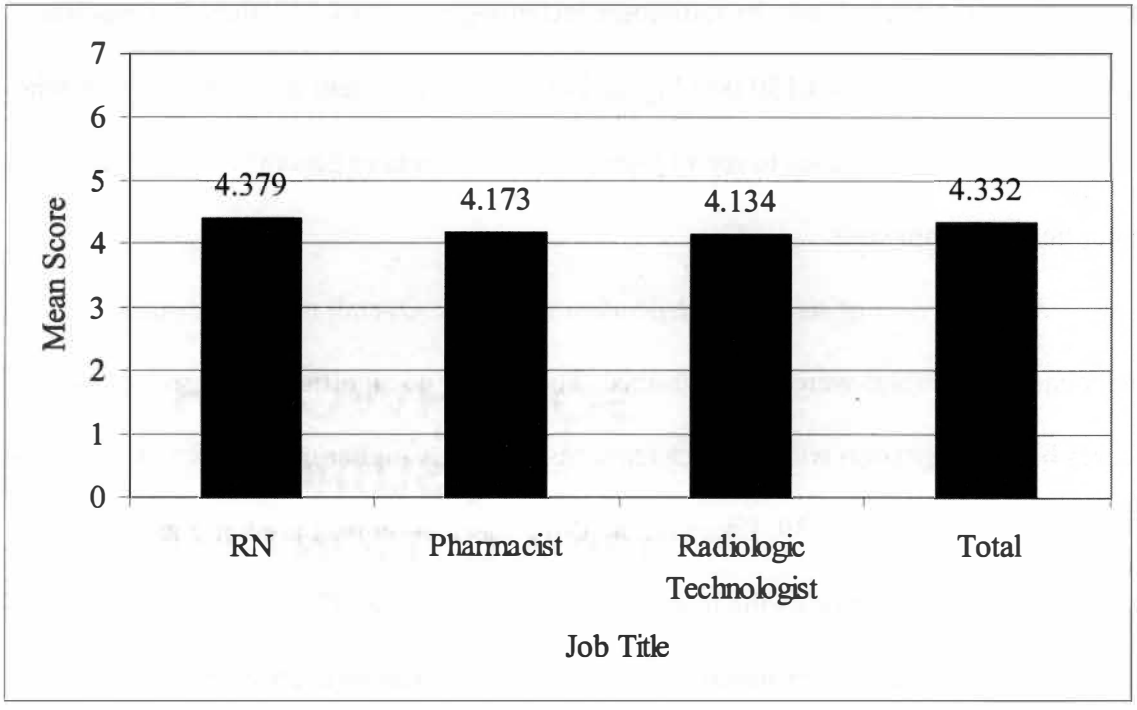

Figure 13. Histogram of Regulatory Complexity mean scores by job title.

determined, followed closely by radiologic technologists with 4.597, then pharmacists with an average score of 4.150 (see Figure 14). This is consistent with Rees (1995), who found hospital-based nurses to report higher levels of stress in general when compared to other health occupations.

Means scores of selected independent variables. Overall means for other independent variables were also examined. There were no significant differences in scores based on gender, with females reporting a slightly higher mean of 4.584, while the average for males was 4.539. Likewise, no differences in scores based on race were apparent. Hispanics reported the highest mean score of 4.698. There were no significant differences in overall scores based on age, with those in the 46 to 55 year age category yielding the highest mean score of 4.634. Mean scores by gender, race, and age are summarized in Table 20.

Personnel working third shift scored higher on the HOSS than those on other shifts, with a mean of 4.635. Employment status had no significant effect on mean scores, with those employed on a full time basis reporting a high of 4.611.

The areas of *nursing–other or general* and *nursing–medical and surgical* had the highest means in terms of departmental scores (4.907 and 4.860, respectively). Those assigned to intensive care units and critical care units had a slightly lower average score of 4.831. Based on the findings of Cooper and Mitchell (1990) and Erlen and Sereika (1997), higher scores for nurses working in critical care areas such as the intensive care unit might have been anticipated.

However, the AHA (2002) indicated that more attention needed to be paid to RNs in settings outside of critical care. In order to foster meaningful work for these

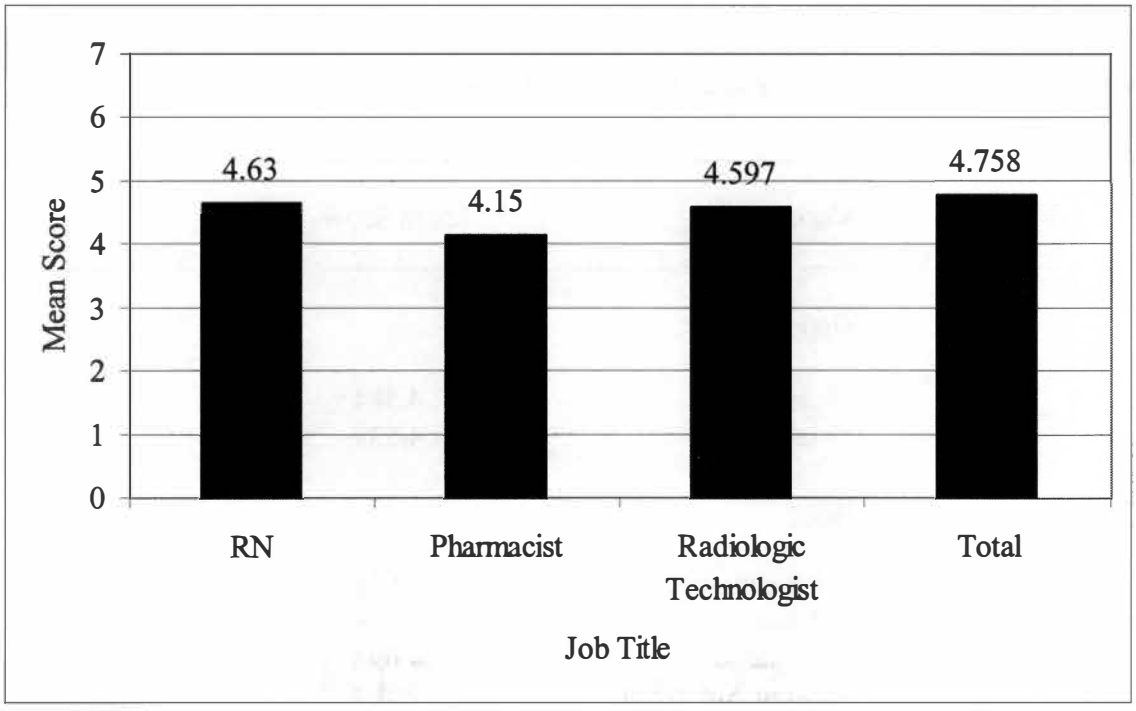

Figure14. Histogram of total mean scores by job title.

Table 20

Mean Scores by Gender, Race and Age for HCA Study

Variable	Mean Score
Gender	
Female	4.584
Male	4.539
Race	
African American	4.668
White	4.568
Hispanic	4.698
Asian American	4.561
Other	0.000
Age Category	
< 25 years	4.389
26 – 35 years	4.584
36 – 45 years	4.553
46 – 55 years	4.634
> 55	4.510

employees, the AHA recommended that leaders "recognize acute care nursing outside intensive care specialty units as a valued clinical role rather than as 'undifferentiated' general service" (p. 24). The overall mean for employees working in surgery was much lower than general nursing and even critical care nursing, at 4.366. This finding was supported by Ogus (1995), who reported that surgical nurses were less stressed than their medical counterparts.

Those who reported supervising others reported higher stress scores than those who did not have supervisory duties, with a mean score of 4.745. This was especially true on the Job Demands factor, where the mean score was 5.055. Respondents reporting a low level of support from their supervisor reported a higher score on the HOSS than those with higher marks for supervision, with a mean of 4.811. Likewise, workers reporting a low level of support or assistance from support staff had a greater mean score than those who reported support staff as being adequate, with a mean of 4.954.

Summary of Findings

Results of the Delphi panel indicated agreement on 38 stressors that became the basis for the pilot version of the HOSS. A factor analysis of the pilot scale indicated that a four-factor, 21-item questionnaire was appropriate for collecting data on a national sample of employees of HCA subsidiaries. Using the HCA data, factor analysis indicated that the HOSS should consist of 18 items and four subscales. Registered nurses, pharmacists, and radiologic technologists working for HCA experienced occupational stress, but overall the level of stress reported was not very high. As a group, the RNs reported the highest level of stress, followed by radiologic technologists. Pharmacists were the least stressed of any group. Of the four factors identified in the study, Job

Demands had the highest scores but during labor shortages this may be expected. While interpersonal conflicts occurred, they transpired only occasionally. No significant differences in scores by gender, race, or age were observed.

CHAPTER VI

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

In this chapter I discuss conclusions based on the findings, including my inferences regarding the strengths, weaknesses, and limitations of the study. Next, I consider implications for professional practice, scholarly understanding and theory building, and future research studies. Finally, I present recommendations for further research and for changing professional practice.

Conclusions

Conclusions Based on the Findings

The study resulted in a valid and reliable instrument for measuring occupational stress in healthcare. Based on the responses of 947 healthcare professionals from 23 states, an interpretable factor structure of latent constructs was determined. The four resulting subscales were Job Demands, Interpersonal Conflicts, Home-Work Balance, and Regulatory Complexity.

Regulatory complexity has emerged as a factor in occupational stress in healthcare. The items for this factor included attending meetings for accreditation purposes, maintaining records, and spending more time on regulatory matters than patient care activities. Registered nurses (RNs), pharmacists, and radiologic technologists feel that regulatory requirements are so onerous that they interfere with the ability of the organization to fulfill its mission.

Of the professions represented in the study, RNs reported higher occupational stress scores than pharmacists and radiologic technologists. This was especially true for

the Job Demands subscale. Pharmacists are the least stressed of the three groups but still reported being in stressful situations about one-half of the time.

The items on the Job Demands subscale contributed to the highest stress scores. Of the eight items in the factor, three were more in control of the organization than the others. These were: (a) *patients are brought to my department for treatment/tests when we are already busy*; (b) *we receive new patients in my department just before quitting time*; and (c) *there is not sufficient time to take rest periods or meal breaks.*

A Delphi panel considered 117 potential stressors and reached consensus on 38. Their agreement led to the omission from the pilot instrument certain statements hypothesized to be related to occupational stress in healthcare. These included items related to the constructs of (a) human immunodeficiency virus (HIV) and acquired immunodeficiency disease (AIDS); (b) workplace violence; (c) sexual harassment; (d) job loss through mergers and acquisitions; and (e) lack of social support. Although individual ratings on these items varied, as a group the subject matter experts did not find these to be major sources of stress across occupational categories.

Investigator's Conclusions

Strengths of the study.

1. HCA's sponsorship of the research was its primary strength. The healthcare organization provided a means with which to analyze the response rates of hundreds of professionals throughout the United States during a time of severe labor shortages.

2. The employee groups sampled have been identified by the American Hospital Association (2002) as the three highest in terms of vacancy rates in hospitals. Therefore, the findings have national significance for the healthcare industry.

3. The findings were consistent with occupational stress theory in that the JD-C model proposed by Karasek (1979) was supported.

4. Participants were randomly selected for the study, permitting inferences about the total population to be made.

5. Respondents worked at various facilities operating in 23 states, providing strong geographical representation for the survey.

6. Subjects were instructed to not identify themselves on the questionnaire, ensuring that responses were honest and truly representative of the perceptions of healthcare workers.

Weaknesses of the study.

1. The primary weakness of the study was related to the response rate of 31.6%. While this was higher than the response rates reported by Cydulka et al. (1997), Frazer and Sechrist (1994), Lyne et al. (2000), and Maurier and Northcott (2000), a low response rate compromises the generalizability of the results to other populations.

2. Chi-square tests for independence indicated nonrespondents were different than respondents on the independent variables of job title, gender, race, age, employment status, years with the organization, and department. This was true despite the use of random selection techniques and a high degree of congruence across three employee occupations on the final factor solution.

Implications

Implications for Professional Practice

Registered nurses, pharmacists, and radiologic technologists are in short supply. These represent the three highest professions in which shortages are being experienced. Hospital vacancy rates during the fall of 2001 were: (a) RNs, 13.0%; (b) pharmacists, 12.7%; (c) and radiologic technologists, 15.2% (AHA, 2002, p. 7).

Given this landscape, the implications of occupational stress for hospitals and other healthcare organization are very serious. The findings will assist human resource development (HRD) practitioners and healthcare administrators in developing strategies to minimize turnover associated with job stress in various health occupations. As reported by the AHA (2002):

> Today, many in direct patient care feel tired and burned-out from a stressful, often understaffed environment, with little or no time to experience the one-on-one caring that should be the heart of hospital employment. (p. 8)

The study revealed that the interface between home and work continued to be a concern for employees. Ongoing staff shortages will increase the likelihood of more employees being placed in an on-call status in the event they are needed to return to the organization. Increases in on-call time and working hours will further exacerbate the infringement on the personal time of employees.

The prevalence of occupational stress in healthcare has implications for increased costs. Smith (1999) reported that job stress costs businesses $300 billion each year, and Wojcik (1999) found that 60% to 80% of on-the-job injuries were related to occupational stress. According to the National Institute for Occupational Safety and Health (1999), 40% of all employees reported having stressful jobs. Recruitment and retention initiatives for health occupations must deal with causes of and solutions for occupational stress.

Until the present study, regulatory complexity as an occupational stress construct had not been examined empirically. According to the AHA (2002), healthcare employees are required to be too focused on "protocols, regulatory compliance, and documentation" (p. 8). Development programs, new technology, and the healthcare educational system will need to address regulatory, accreditation, and documentation issues in order to mitigate the stress these requirements create for workers. The paperwork requirements placed on healthcare organizations by payors is complicated and contributes to stressful working conditions.

Implications for Scholarly Understanding and Theory Building

While the theoretical framework focused on instrument development, the

phenomenon of pharmacists reporting lower levels of stress than RNs on all subscales supported the Job Demand-Control (JD-C) model proposed by Karasek (1979). The JD-C theory provided the conceptual framework for the study. Pharmacists have similar job demands but more autonomy than RNs in terms of setting priorities for tasks (Schommer, 2001). They also do not answer nursing call lights, interact with the patient's family, and are not assigned to the hands-on care of patients occupying beds in different rooms. According to Karasek, increased decision latitude offsets the mental strain of high job demands.

The fact that RNs in general or acute care settings scored higher on the Health Occupations Stress Scale (HOSS) than RNs in surgery further supported Karasek's (1979) theory. Registered nurses working in surgery have more decision latitude than RNs assigned to patients on a nursing unit, although job demands may be similar. Surgical RNs have the opportunity to interact with physicians on a more collegial basis and influence the scheduling of surgical procedures. The JD-C theory suggested that such autonomy reduced the effects of job stress.

Implications for Future Research Studies

The lack of agreement by the Delphi panel on certain constructs prominent in the healthcare literature was unexpected. It was anticipated that occupational stress associated with HIV and AIDS, violence and sexual harassment, mergers and acquisitions, and lack of social support would be adopted as being relevant to the current workforce. Perhaps these concepts have been adequately addressed through training on personal protective equipment, better enforcement of laws, and changing demographics of the workforce. The results of the present study indicated that the workforce of the 21st

century was more concerned with eliminating job hassles and interferences with life outside of work.

Recommendations

Recommendations for Further Research

Additional research using the HOSS is needed in order to test its factor structure using other healthcare occupations and populations. Studies using employees from government-owned, religious-affiliated, and not-for-profit healthcare entities are recommended. Scores from these sectors of the industry could be compared to those of the present study. Future research should include respiratory therapists, physical and occupational therapists, dietitians, and laboratory personnel such as medical technologists and medical laboratory technicians, for the AHA (2002) identified these professions as experiencing labor shortages also.

Additional empirical research is needed in the area of occupational stress associated with regulatory complexity, particularly JCAHO accreditation preparation and readiness, and the amount of documentation required to be reimbursed properly under a managed care arrangement. It is recommended that hospitals and organizations minimize the effects of these stressors through HRD programs and upgraded technology. Healthcare companies that ignore the regulatory complexities faced by its workforce will likely see increased stress levels and turnover rates.

Recommendations for Changing Professional Practice

Human resource development programs should include aspects that address accreditation and record keeping during the new employee orientation period and again annually through planned educational activities. These might include directed learning

modules, games, relaxation therapy, and conducting mock accreditation surveys. Employees need to understand the importance of the complicated regulations intrinsic to healthcare, especially in terms of their impact on reimbursement, legal compliance, and measuring the quality of patient care. Organizations should support their employees by acquiring computer software and hardware that reduces the amount of paperwork and redundancy inherent in large, complex systems. By reducing the number of annoyances leading to frustration and stress, such as the several data entry screens required to enter an order or duplicate entries necessary for various fields, healthcare organizations would soon recognize that RNs were spending more time with patients.

Human resources practitioners in healthcare organizations should promote family friendly strategies that emphasize rest, recreation, and exercise. Programs should be developed that teach the importance of sleep and it is recommended that organizations include wellness benefits in their health plans.

To entice workers to enter the nursing field, an increasing number of healthcare organizations have added scholarships and tuition reimbursement plans to their employee benefits programs. This is an encouraging trend, but stressed and exhausted workers may not want to attend classes after working all day, nor stay until the evening lecture is completed. Partnerships with universities and colleges should be developed that lead to classes being offered on the healthcare organization's campus, where feasible.

Colleges sometimes lack funding for new equipment, technology, and classrooms, whereas hospital educational facilities are often underutilized after hours. This worksite-based coursework approach could also facilitate opportunities for the healthcare organization to encourage its staff with master's degrees in nursing to serve as adjunct

faculty, in return for a favorable placement status with the college, given that a shortage of nursing instructors also exists (Northwest Health Foundation, 2001). In circumstances where distance learning is an option, the healthcare organization should be flexible in permitting its employees to use computer equipment and internet access for coursework during the evenings and on weekends.

Development programs for physicians should include information regarding the detrimental affects of employee stress on their practices. These professionals need to understand that high turnover and vacancy rates may have a negative impact on quality of care and the ability of their patients to recover. Both the review of literature and the present study indicated that conflicts with physicians continued to be an occurrence most employees identified with. Occupational stress affects all healthcare professions, including medicine.

The Job Demands subscale of the HOSS contained three items that were largely in the control of the organization. Human resources professionals should work with healthcare administrators to alleviate these stressors. Basic management theory indicates that periodic rest periods actually increase productivity output (Robbins, 1991). Management training programs could be designed to address the importance of providing meals breaks and rest periods, and the importance of minimizing add-on examinations.

Summary of Conclusions, Implications, and Recommendations

The HOSS was developed to aid researchers in the psychometric determination of stress in health occupations. Human resources practitioners may use the instrument as a basis for establishing workforce development programs that address occupational stress. Registered nurses reported higher levels of stress than radiologic technologists, and these

reported higher levels of stress than pharmacists. These three presently endure the highest labor shortages among all healthcare professions.

Regulatory complexity has surfaced as a theoretical construct in the field of occupational stress. Further research in this area is recommended. Nurses report that job stress and demanding work are their top concerns (Worthington, 2001). Human resources professionals have unlimited opportunities to make positive contributions to the field by finding solutions to occupational stress in healthcare.

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APPENDIX A

TITLE AND YEAR OF PUBLICATION FOR PRIMARY STRESS SCALES CITED IN THE REVIEW OF LITERATURE

Primary Stress Scale Cited	Year of Publication	Researcher(s) Using Scale
1. Nursing Stress Scale	1981	Hemingway & Smith, 1999
2. Nursing Stress Scale	1981	Hillhouse & Adler, 1997
3. Scale by Parker and DeCotiis	1983	Jamal & Baba, 2000
4. Scale Developed by Researcher	1998	Mahat, 1998
5. Job Content Questionnaire	1985	Cheng et al., 2000
6. Occupational Stress Indicator	1988	Sparks & Cooper, 1999
7. Scale Developed by Researcher	1993	De, Jonge, Van Breukelen, et al., 1999
8. Maslach Burnout Inventory	1981	Iverson et al., 1998
9. Nursing Stress Inventory	1984	Ogus, 1995
10. Scale Developed by Researcher	1993	De Rijk et al., 1998
11. Scale Developed by Researcher	1993	DeJonge, Mulder, et al., 1999
12. Scale Developed by Researcher	1998	Aiken et al., 2001
13. Scale Developed by Researcher	1998	Cengelosi et al., 1998
14. Scale Developed by Researcher	1986	Taunton et al., 1997
15. Scale by Parker and DeCotiis	1983	Fang & Baba, 1993
16. Occupational Stress Indicator	1988	Rees, 1995
17. General Health Questionnaire	1988	Ramirez et al., 1996
18. Scale Developed by Researcher	1994	Frazer & Sechrist, 1994
19. Maslach Burnout Inventory	1981	Gueritault-Chalvin et al., 2000

Primary Stress Scale Cited	Year of Publication	Researcher(s) Using Scale
20. Scale Developed by Researcher	1995	Mongomery & Lewis, 1995
21. AIDS Stress Scale	1998	Niven & Knussen, 1999
22. Indianapolis Network Mental Health Study – Staff Questionnaire	1989	Mesch et al., 1999
23. Scale from a Master's Thesis	1979	Maurier & Northcott, 2000
24. Occupational Stress Indicator	1988	Evers et al., 2000
25. Scale from a Dissertation	1990	Neumann & Chi, 1998
26. Application of Events Checklist	1992	Rietschlin, 1998
27. Nursing Students Stress Scale	1995	Admi, 1997
28. Stress Assessment Inventory	1990	Rowe, 2000
29. General Health Questionnaire	1988	Proctor et al., 1998
30. Medical Personnel Stress Scale	1985	Hromco et al., 1995
31. Medical Personnel Stress Scale	1985	Cydulka et al., 1997
32. Medical Personnel Stress Scale	1985	Herron et al., 1999
33. Nursing Stress Index	1989	Cooper & Mitchell, 1990
34. Nursing Stress Scale	1981	Healey & McKay, 2000
35. Health Professions Stress Inventory	1988	Gupchup & Wolfgang, 1994
36. Health Professions Stress Inventory	1988	Erlen & Sereika, 1997

APPENDIX B

COVER LETTER TO DELPHI PANEL

ROUND 1

October 22, 2001

Psychometric Determination of Stress in Health Occupations
Delphi Questionnaire

Dear Healthcare Colleague:

Thank you for serving as a subject matter expert for this important study about occupational stress in healthcare. The use of an anonymous panel of experts to reach a consensus is called the Delphi Technique.

The attached questionnaire contains several items indicative of job stress in health occupations. The list is based on a review of related literature during which previous studies were considered and analyzed. Through two or three rounds of review by the panel, these will be reduced to reflect those items most closely representing the concept of stress according to expert opinion. The first round will take the longest amount of response time.

Also attached is a short biographical questionnaire that I need for my records.

Please save both to a file and return as attachments by November 6, 2001.

If you need assistance, have difficulties opening the attachments or have questions about the process, please contact me by e-mail at dgilbert@utk.edu or call me collect at 423-476-4525 (home) after 6:00 p.m. eastern time.

Daniel L. Gilbert
3525 Crown Colony Drive
Cleveland, Tennessee 37312

APPENDIX C

BIOGRAPHICAL QUESTIONNAIRE FOR DELPHI PANEL

Delphi Panel Member
Biographical Questionnaire

Attach additional pages if necessary
Please save to a file and return as an attachment

Name:

Organization:

Job Title:

Years in present position:

Years in profession:

Gender: Race: Normal Shift:

Age category:
____ 19 or under
____ 20 - 35
____ 36 - 55
____ over 55

Registry, License or Certifications you hold:

Educational Background (degree or degrees earned, majors, etc.)

Daytime telephone number:

Optional: Why did you agree to serve as a panel member?

The information requested above is for my records only and will not be disclosed.

APPENDIX D

INSTRUCTIONS TO DELPHI PANEL

ROUND 1

Delphi Questionnaire: Round 1

Instructions

Read ALL items carefully before responding. Indicate the degree to which you believe the statement is associated with occupational stress in healthcare. The range of responses is from 1 (strongly disagree) through 7 (strongly agree). If you rate an item "1," then you believe the statement is not likely to be made by a worker experiencing stress.

The items are in no particular order of importance and items at the beginning of the list do not possess greater weight than items towards the end of the list. Any redundancy of items is intentional.

In the space provided, please add any items you believe should be included on the list. In the comments section, please note any items you found to be ambiguous or confusing.

Rate the items in this manner: 1 = Strongly Disagree; 2 = Disagree; 3 = Somewhat Disagree; 4 = Neutral; 5 = Somewhat Agree; 6 = Agree; 7 = Strongly Agree

After you have finished, please save to a file and return as an attachment.

APPENDIX E

INSTRUCTIONS TO DELPHI PANEL

ROUND 2

Delphi Questionnaire: Round 2

Instructions

Read ALL items carefully before responding.

The first column represents the median score for the item from Round 1. The median is the number in the middle of a distribution. Half the numbers have values greater than the median, and half have values that are less than the median. In case of an even number of responses for the item, the median calculated the average of the two middle numbers. For example, the median for item #5 was 4, meaning that half the responses were above 4 and half were below it. If an item had a median of 7, this means that several respondents gave the statement a rating of "7," or strongly agreed that the item was associated with occupational stress in healthcare.

In the second column is a space for you to rate the item again in the second round. The items are in the same sequence as they appeared in the Round 1. After reviewing the median, indicate the degree to which you believe the statement is associated with occupational stress in healthcare. Please rate all 117 items and you may change your rating on an item during Round 2.

Rate the items in this manner: 1 = Strongly Disagree; 2 = Disagree; 3 = Somewhat Disagree; 4 = Neutral; 5 = Somewhat Agree; 6 = Agree; 7 = Strongly Agree. If you rate an item "1," then you believe the statement is not likely to be made by a worker experiencing stress.

The items are in no particular order of importance and items at the beginning of the list do not possess greater weight than items towards the end of the list. Any redundancy of items is intentional.

Following the original items are some new statements suggested by panel members for inclusion as occupational stress indicators. Please rate these new items according to the 7-item scale described above.

After you have finished the entire survey, please save to a file and return as an attachment.

APPENDIX F

INITIAL ITEM POOL, MEDIANS AND INTERQUARTILE RANGES

DELPHI PANEL RESULTS

Medians and Interquartile Ranges for Delphi Round 1 and Round 2

	Round 1		Round 2		
No.	Median	IQR	Median	IQR	Item
1.[abcd]	7.0	1.25	7.0	1.0	I care for critically ill or injured patients who may die.
2.[abc]	6.0	1.0	6.0	1.0.	I am interrupted by telephone calls while performing tasks.
3.[abcd]	5.0	2.0	5.0	0.5	I experience conflicts with coworkers.
4.[b]	5.0	2.25	5.0	2.0	Employees are absent or tardy.
5.	4.0	2.25	4.0	1.0	I feel that I could be physically harmed on this job.
6.	3.5	3.0	4.0	1.5	I experience conflicts with my supervisor.
7.[ab]	6.0	1.0	6.0	1.5	I am not paid adequately for my work.
8.[ab]	5.0	2.0	5.0	1.0	I spend too much time entering items into the computer system.
9.	4.0	2.75	4.0	2.5	We have insufficient staff to take care of patients.
10.[abcd]	5.0	1.25	5.0	1.0	I experience conflicts with physicians.
11.[b]	4.5	4.25	5.0	1.5	I deal with the death of patients
12.	4.0	4.0	4.0	1.5	I experience interpersonal conflicts with physicians.
13.	4.0	1.5	4.0	0.0	I have disagreements with physicians about patient care.

Continued

No.	Round 1 Median	Round 1 IQR	Round 2 Median	Round 2 IQR	Item
14.	4.0	2.25	4.0	2.0	Someone else decides what the priorities will be for my shift.
15.[ab]	5.5	2.0	6.0	1.0	Employees quit my organization.
16.	4.0	2.5	4.0	2.0	I worry about catching an infection on this job.
17.[bcd]	6.0	3.25	6.0	1.0	I attend meetings required for accreditation or regulatory reasons.
18.[abcd]	5.5	1.25	6.0	0.5	I keep up with records required for accreditation or regulatory reasons.
19.[abcd]	7.0	1.0	7.0	0.5	I have to balance job demands and home demands.
20.	4.5	2.5	3.0	2.5	There is a lack of support for employees.
21.	3.0	1.0	3.0	1.0	Equipment does not work properly.
22.	2.5	2.0	3.0	1.5	I do not have adequate equipment to perform my duties.
23.	3.0	2.5	3.0	1.0	I do not have adequate supplies to perform my duties.
24.[abcd]	6.0	1.5	6.0	1.0	We receive new patients in my department just before quitting time.
25.	4.5	2.75	4.0	1.5	Physicians wait to order tests on patients until just before quitting time.
26.[bcd]	5.5	2.5	6.0	1.0	Patients are brought to my department for treatment/tests when we are already busy.

Continued

No.	Round 1 Median	Round 1 IQR	Round 2 Median	Round 2 IQR	Item
27.	1.0	1.0	1.0	1.0	There are rumors or reports that my organization is merging with another.
28.	1.0	1.0	2.0	4.0	There are rumors or reports that my organization is being sold.
29.	2.5	3.5	2.0	4.0	There are rumors or reports that my organization will lay people off.
30.[b]	4.0	4.0	5.0	1.5	Efforts have been made by management to redesign my job.
31.	1.0	1.0	1.0	1.0	There are rumors or reports that employees have threatened to commit violent acts.
32.	1.0	1.25	1.0	0.5	There are rumors or reports that patients have threatened to commit violent acts.
33.	1.0	1.25	1.0	1.0	There are rumors or reports that visitors have threatened to commit violent acts.
34.	1.0	1.0	1.0	0.0	Employees have committed violent acts.
35.	1.5	1.25	1.0	1.0	Patients have committed violent acts.
36.	1.5	1.25	1.0	0.5	Visitors have committed violent acts.
37.[bcd]	5.0	3.5	5.0	1.5	Physicians are disrespectful.
38.	4.0	2.5	4.0	1.0	I lack the opportunity to do what I do best.

Continued

No.	Round 1 Median	Round 1 IQR	Round 2 Median	Round 2 IQR	Item
39.[bcd]	5.5	3.25	6.0	1.5	I supervise the assignments of others.
40.[b]	4.0	2.25	5.0	1.0	I fear making a mistake on my job.
41.	4.0	2.25	4.0	2.0	Physicians are uncooperative.
42.	4.5	2.5	4.0	3.0	Physicians order or conduct unnecessary examinations on patients.
43.	2.5	1.5	2.0	1.5	There is a lack of respect by coworkers.
44.	3.0	1.25	2.0	2.0	There is a lack of respect by my supervisor.
45.	4.0	3.0	4.0	2.0	My facility initiates organizational change programs that I do not understand.
46.	3.5	2.25	4.0	2.5	There is a lack of good supervision.
47.	3.5	1.25	3.0	1.5	There is a lack of supervisory support.
48.	1.0	1.25	1.0	1.0	The mission of my organization does not seem important.
49.	3.0	1.25	3.0	1.5	I lack power in my position.
50.	3.0	1.25	3.0	1.0	There is a lack of coworker support.
51.[b]	5.0	3.0	5.0	2.0	There is low morale among employees .
52.	2.0	3.0	1.0	1.5	I lack stability in my home life.
53.	4.5	1.25	4.0	3.0	There is a lack of physician support.

Continued

	Round 1		Round 2		
No.	Median	IQR	Median	IQR	Item
54.[ab]	5.0	1.0	5.0	1.0	I experience workplace politics on the job.
55.	2.5	3.25	2.0	0.0	My supervisor does not care about me as a person.
56.	3.5	1.5	3.0	1.0	There is a lack of development opportunities.
57.	4.5	3.25	4.0	1.5	I feel like there are few prospects for promotion.
58.	5.0	3.25	5.0	3.0	I feel undervalued for the work I do.
59.	3.0	2.25	3.0	0.0	There is a lack of training for employees.
60.	2.0	1.5	2.0	1.0	The attitude of my spouse/significant other is negative towards my job.
61.[bcd]	5.0	3.25	5.0	1.5	My work places a great demand on my family.
62.	4.0	2.25	4.0	2.0	Equipment breaks down in my department .
63.	3.5	1.5	4.0	2.0	There is a lack of good management practices.
64.	5.0	3.75	4.0	1.5	I lack adequate time to get my job done.
65.	3.5	3.0	4.0	2.0	I fear being exposed to HIV and AIDS.
66.	2.5	2.5	3.0	1.0	I do not have authority to make decisions.

Continued

No.	Round 1 Median	Round 1 IQR	Round 2 Median	Round 2 IQR	Item
67.	2.0	2.25	4.0	2.0	I do not participate in decision making.
68.[bc]	6.0	2.25	6.0	0.0	I am expected to work hard.
69.[abcd]	5.0	1.25	5.0	1.5	The expectations regarding my work assignments are excessive.
70.[b]	4.5	1.0	5.0	1.5	I experience conflicting demands on my job.
71.	4.0	2.25	4.0	2.0	If I could find a better job I would leave.
72.[b]	5.0	2.5	5.0	1.0	I am expected to work fast.
73.[abcd]	5.0	1.5	5.0	2.0	I am tired when I wake up.
74.	2.5	2.25	2.0	1.5	I am in poor health.
75.	3.5	2.5	4.0	1.5	I prefer not to take care of HIV/AIDS patients.
76.	4.0	3.25	4.0	3.0	There is a lack of clerical support.
77.	3.0	2.25	3.0	1.5	There is a lack of support from coworkers.
78.	3.5	3.0	4.0	2.0	I take work home to complete it.
79.	4.0	3.25	4.0	3.0	I think about quitting.
80.[ab]	5.0	1.0	5.0	2.0	I spend more time doing paperwork than taking care of patients.
81.[b]	4.5	1.0	5.0	1.0	I spend more time entering things into computer than taking care of patients.

Continued

	Round 1		Round 2		
No.	Median	IQR	Median	IQR	Item
82.[bcd]	4.0	2.0	5.0	2.0	I spend more time on accreditation or regulatory issues than taking care of patients.
83.	2.0	1.25	2.0	1.0	I lack adequate training to do my job well.
84.[a]	5.0	1.25	5.0	2.25	I participate in programs or events that help my community.
85.	5.0	2.5	5.0	3.0	I attend religious services.
86.	6.5	2.75	6.0	2.5	I participate in family gatherings.
87.	2.0	2.0	2.0	1.0	I do not understand my role in the organization.
88.	2.0	1.25	2.0	1.5	My supervisor lacks understanding about my role in the organization.
89.	2.0	1.0	2.0	1.0	I do not understand my job duties.
90.	3.0	0.5	2.0	1.0	My supervisor lacks understanding about my job duties.
91.	3.5	3.25	3.0	2.0	I receive inadequate feedback from my supervisors regarding my performance.
92.	2.5	3.25	2.0	1.0	I lack freedom in how I perform my tasks.
93.	2.0	2.25	2.0	0.5	I do not know what is expected from me at work.
94.	2.0	1.25	2.0	0.0	There is a lack of communication regarding my schedule or work hours.

Continued

	Round 1		Round 2		
No.	Median	IQR	Median	IQR	Item
95.	1.5	1.25	2.0	1.0	There is a lack of consistency in the hours I am assigned to work from week to week.
96.	3.0	3.0	3.0	1.5	I lack control over issues that affect my work.
97.	3.0	3.0	5.0	3.0	I do not have sufficient power to make significant changes at work.
98.	3.5	4.0	3.0	1.5	I do not decide the way in which my work is performed.
99.	3.0	2.5	3.0	2.0	I lack involvement in decisions that affect my work.
100.	3.5	2.25	3.0	2.0	I feel like what I do at work is beyond my control.
101.[bcd]	4.0	2.5	5.0	2.0	I spend too much time trying to keep up with the work load.
102.[b]	5.0	2.5	5.0	1.0	Insurance companies have more control over my patient's care than I do.
103.[abcd]	6.5	2.0	6.0	0.5	My job is physically demanding.
104.[abcd]	6.0	1.0	7.0	1.0	My job is mentally demanding.
105.	4.5	5.25	3.0	2.5	I get sent home because of lack of work.
106.[b]	4.5	2.25	5.0	1.5	I am pressured to work overtime or past the end of my shift.
107.[ab]	5.0	1.5	5.0	2.0	I have a hectic work schedule.

Continued

	Round 1		Round 2		
No.	Median	IQR	Median	IQR	Item
108.	1.0	1.0	1.0	0.0	I experience sexual harassment in the workplace.
109.	3.0	2.5	3.0	2.0	The expectations about my assignments are unrealistic.
110.[abc]	5.0	2.0	5.0	1.5	I think about work when I prepare to go to sleep.
111.	2.5	3.25	3.0	3.5	I look for job openings at other organizations.
112.	4.0	2.25	3.0	2.5	There is a lack of communication from management.
113.[ab]	5.0	2.0	5.0	1.5	There is a lack of communication between departments.
114.	3.5	1.5	4.0	2.0	I am overwhelmed by my responsibilities.
115.	2.0	0.0	2.0	1.0	I have experienced some form of discrimination on the job.
116.	3.0	4.25	3.0	2.5	I lack adequate work space to perform my tasks.
117.[bcd]	5.0	2.25	5.0	2.0	There is not sufficient time to take rest periods or meal breaks.

[a]Items on which Delphi panel reached consensus in Round 1. [b]Items on which Delphi panel reached consensus in Round 2 and included on pilot version of HOSS. [c]Items on HOSS mailed to HCA sample. [d]Items on HOSS following final factor analysis.

APPENDIX G

COVER LETTER FOR PILOT STUDY

Memorandum

February 26, 2002

FROM: Dan Gilbert, Human Resources
493-1599

SUBJECT: Opportunity to participate in a pilot study on occupational stress

Dear Colleague:

In conjunction with HCA and the University of Tennessee, I am conducting a national study of job stress in health occupations. The purpose of the study is to determine the extent to which employees experience stress in their daily work. HCA plans to use the data to assess the implications on retention and turnover and explore strategies for addressing worker stress.

The pilot phase of the study involves distributing and collecting a survey instrument to selected employee groups of Parkridge Health System. Attached to this memorandum is the survey form that was developed in collaboration with a panel of experts from several states across the country. Your participation is needed in completing the survey and returning it to human resources in the envelope provided.

Participation in this study is voluntary and all responses will be confidential. Your name is not required. Given the exploratory nature of the survey form, please feel free to write any questions, comments or suggestions regarding any items you believe may be unclear, confusing or difficult to understand. These may be written directly on the form, or on a separate page.

Please return the completed survey form to Human Resources by March 5, 2002.

Thank you for cooperation and participation.

APPENDIX H

HEALTH OCCUPATIONS STRESS SCALE

PILOT VERSION

Health Occupations Stress Scale

The purpose of this survey is to obtain information about your perceptions of job stress. Your responses will be kept strictly confidential and your name is not required on this form. It is important for you to answer each item as truthfully as possible.

DIRECTIONS:
For each statement listed below, **circle the number** that most closely reflects your opinion. There are seven
possible choices for each item:

Never	Rarely	Occasionally	Half of the time	Frequently	Almost Always	Always
1	2	3	4	5	6	7

There is no right or wrong answer or time limit. However, please respond to every item on the list.

	Never Always
1. I experience conflicting demands on my job	1 2 3 4 5 6 7
2. I care for critically ill or injured patients who may die	1 2 3 4 5 6 7
3. I am interrupted by telephone calls while performing tasks	1 2 3 4 5 6 7
4. I attend meetings required for accreditation or regulatory reasons	1 2 3 4 5 6 7
5. I have to balance job demands and home demands	1 2 3 4 5 6 7
6. I am expected to work hard	1 2 3 4 5 6 7
7. I am not paid adequately for my work	1 2 3 4 5 6 7
8. I spend too much time entering items into the computer system	1 2 3 4 5 6 7
9. I experience conflicts with physicians	1 2 3 4 5 6 7
10. Employees quit my organization	1 2 3 4 5 6 7
11. I experience conflicts with coworkers	1 2 3 4 5 6 7
12. I am tired when I wake up	1 2 3 4 5 6 7
13. I spend more time doing paperwork than taking care of patients	1 2 3 4 5 6 7
14. My job is mentally demanding	1 2 3 4 5 6 7
15. Patients are brought to my department for treatment/tests when we are already busy	1 2 3 4 5 6 7
16. Efforts have been made by management to redesign my job	1 2 3 4 5 6 7
17. The expectations regarding my work assignments are excessive	1 2 3 4 5 6 7
18. Physicians are disrespectful	1 2 3 4 5 6 7
19. I am pressured to work overtime or past the end of my shift	1 2 3 4 5 6 7
20. I supervise the assignments of others	1 2 3 4 5 6 7
21. I keep up with records required for accreditation or regulatory reasons	1 2 3 4 5 6 7
22. I fear making a mistake on my job	1 2 3 4 5 6 7
23. I experience workplace politics on the job	1 2 3 4 5 6 7
24. There is low morale among employees	1 2 3 4 5 6 7
25. I am expected to work fast	1 2 3 4 5 6 7
26. I spend more time entering things into computer than taking care of patients	1 2 3 4 5 6 7
27. My work places a great demand on my family	1 2 3 4 5 6 7
28. I spend too much time trying to keep up with the work load	1 2 3 4 5 6 7
29. Insurance companies have more control over my patient's care than I do	1 2 3 4 5 6 7
30. My job is physically demanding	1 2 3 4 5 6 7
31. Employees are absent or tardy	1 2 3 4 5 6 7
32. I spend more time on accreditation or regulatory issues than taking care of patients	1 2 3 4 5 6 7
33. I deal with the death of patients	1 2 3 4 5 6 7
34. I have a hectic work schedule	1 2 3 4 5 6 7
35. We receive new patients in my department just before quitting time	1 2 3 4 5 6 7
36. There is a lack of communication between departments	1 2 3 4 5 6 7
37. There is not sufficient time to take rest periods or meal breaks	1 2 3 4 5 6 7
38. I think about work when I prepare to go to sleep	1 2 3 4 5 6 7

Demographic Information

1. Job Title: _____

2. Gender: ___ Female ___ Male

3. Race/EEO origin:

____ African American
____ White
____ Hispanic
____ Asian American
____ Other

4. Age:
____ under 25
____ 26-35
____ 36-45
____ 46-55
____ over 55

5. Marital status:
____ Single
____ Married
____ Widowed
____ Divorced

6. Job Status:
____ Full Time
____ Part Time
____ PRN

7. Primary shift:
____ 1st
____ 2nd
____ 3rd

8. Highest level of education attained:

____ Did not complete high school or GED
____ High school or GED
____ Associate degree in Nursing
____ 3-year nursing degree
____ Nursing diploma
____ Bachelor's degree in nursing
____ Master's degree in nursing
____ Associate degree, other field:
____ Bachelor's degree, other field:
____ Master's degree, other field:
____ Other degree:

If you checked "other field" or "other degree" please specify major or degree:
_____

9. Length of service with organization:

____ 1 year or less
____ 2-5 years
____ 6-10 years
____ 11-20 years
____ 21-30 years
____ more than 30 years

10. Time in present position:

____ 1 year or less
____ 2-5 years
____ 6-10 years
____ 11-20 years
____ 21-30 years
____ more than 30 years

11. Do you supervise other workers?
____ yes
____ no

12. Type of department/unit to which you are primarily assigned (please select only one):

____ Medical/surgical
____ Mental health
____ Emergency
____ Laboratory
____ Surgery/O.R.
____ Imaging/Radiology
____ Recovery
____ Pharmacy
____ ICU
____ Physical Therapy
____ CCU
____ Occupational Therapy
____ Cardiology
____ Respiratory Therapy
____ Oncology
____ Administrative
____ Neonatal
____ OB/GYN
____ Pediatrics
____ Rehabilitation
____ Other: _____

13. How would you rate the level of support you receive from your supervisor(s)?

____ High ____ Medium ____ Low

14. How would you rate the level of support you receive from support staff?

____ High ____ Medium ____ Low

15. Number of people in household:

____ Self only ____ 2 ____ 3-5
____ 6 or more

Please complete both sides

APPENDIX I

COVER LETTER FOR HCA STUDY

THE UNIVERSITY OF TENNESSEE

Department of Human Resource Development
25 HPER Building
1914 Andy Holt Ave.
Knoxville, Tennessee 37996-2745
(865) 974-4466
FAX: (865) 974-3961
ewbrewer@utkux.utcc.utk.edu

April 19, 2002

Dear Colleague:

The enclosed survey is part of a research project I am conducting as part of my Ph.D. program in Human Resources Development at The University of Tennessee. As a member of the healthcare profession, I know that occupational stress is a growing concern, especially during times of severe workforce shortages. The purpose of the survey is to collect information regarding your perceptions of occupational stress. The information will be used to make recommendations to industry leaders regarding workplace improvements.

Your cooperation is very much appreciated. Participation is voluntary and confidential. The questionnaires have an identification number for mailing purposes only. This is so I may remove your name from the mailing list when your questionnaire is returned. Do not place your name on the questionnaire. Upon receipt of your completed survey form, your name will be entered into a drawing for a chance to win one of four gift certificates of the winner's choice.

Please read all instructions carefully. After completing both sides of the enclosed form, please return it in the envelope provided by May 15, 2002.

HCA has given their endorsement of this project. This study is not part of the HCA employee survey conducted annually by The Gallup Organization on behalf of HCA.

Thank you for your contribution to this important research.

Respectfully,

Daniel L. Gilbert
Ph.D. Candidate

XC: Dr. Ernest W. Brewer
Professor and Chair of Doctoral Committee
The University of Tennessee

HCA
E-mail: corporateservices2@hcahealthcare.com

APPENDIX J

HEALTH OCCUPATIONS STRESS SCALE

VERSION MAILED TO EMPLOYEES OF HCA FACILITIES

Health Occupations Stress Scale

The purpose of this survey is to obtain information about your perceptions of job stress. Your responses will be kept strictly confidential and your name is not required on this form. It is important for you to answer each item as truthfully as possible. There is no right or wrong answer or time limit. However, please respond to every item on the list.

DIRECTIONS:

For each statement listed below, **circle the number** that most closely reflects your opinion. There are seven
possible choices for each item:

Never	Rarely	Occasionally	Half of the time	Frequently	Almost Always	Always
1	2	3	4	5	6	7

	Never						Always
1. I care for critically ill or injured patients who may die	1	2	3	4	5	6	7
2. I am interrupted by telephone calls while performing tasks	1	2	3	4	5	6	7
3. I attend meetings required for accreditation or regulatory reasons	1	2	3	4	5	6	7
4. I have to balance job demands and home demands	1	2	3	4	5	6	7
5. I am expected to work hard	1	2	3	4	5	6	7
6. I experience conflicts with physicians	1	2	3	4	5	6	7
7. I experience conflicts with coworkers	1	2	3	4	5	6	7
8. I am tired when I wake up	1	2	3	4	5	6	7
9. My job is mentally demanding	1	2	3	4	5	6	7
10. Patients are brought to my department for treatment/tests when we are already busy	1	2	3	4	5	6	7
11. The expectations regarding my work assignments are excessive	1	2	3	4	5	6	7
12. Physicians are disrespectful	1	2	3	4	5	6	7
13. I supervise the assignments of others	1	2	3	4	5	6	7
14. I keep up with records required for accreditation or regulatory reasons	1	2	3	4	5	6	7
15. My work places a great demand on my family	1	2	3	4	5	6	7
16. I spend too much time trying to keep up with the work load	1	2	3	4	5	6	7
17. My job is physically demanding	1	2	3	4	5	6	7
18. I spend more time on accreditation or regulatory issues than taking care of patients	1	2	3	4	5	6	7
19. We receive new patients in my department just before quitting time	1	2	3	4	5	6	7
20. There is not sufficient time to take rest periods or meal breaks	1	2	3	4	5	6	7
21. I think about work when I prepare to go to sleep	1	2	3	4	5	6	7

Demographic Information

1. Job Title: _____

2. Marital status:
___ Single
___ Married
___ Widowed
___ Divorced

3. Primary shift:
___ 1st
___ 2nd
___ 3rd

4. Highest level of education attained:

___ Did not complete high school or GED
___ High school or GED
___ Associate degree in Nursing
___ 3-year nursing degree
___ Nursing diploma
___ Bachelor's degree in nursing
___ Master's degree in nursing
___ Associate degree, other field:
___ Bachelor's degree, other field:
___ Master's degree, other field:
___ Other degree:

If you checked "other field" or "other degree" please specify major or degree:
_____

5. Length of service with organization:

___ 1 year or less
___ 2-5 years
___ 6-10 years
___ 11-20 years
___ 21-30 years
___ more than 30 years

6. Time in present position:

___ 1 year or less
___ 2-5 years
___ 6-10 years
___ 11-20 years
___ 21-30 years
___ more than 30 years

7. Do you supervise other workers?
___ yes
___ no

8. How would you rate the level of support you receive from your supervisor(s)?

___ High ___ Medium ___ Low

9. How would you rate the level of support you receive from support staff?

___ High ___ Medium ___ Low

10. Number of people in household:

___ Self only ___ 2 ___ 3-5
___ 6 or more

For each statement listed below, circle the number that most closely reflects your opinion. There are seven possible choices for each item:

Strongly Disagree			Neutral			Strongly Agree
1	2	3	4	5	6	7

11. In the next twelve months I plan to seek employment with a different organization 1 2 3 4 5 6 7

12. If I could find a better job I would quit my organization 1 2 3 4 5 6 7

13. Employees quit my organization 1 2 3 4 5 6 7

Please complete both sides

APPENDIX K

POST CARD MAILED TO

EMPLOYEES OF HCA FACILITIES

June 7, 2002

Dear Healthcare Colleague,

Recently you received a copy of the Health Occupations Stress Scale to complete and return to The University of Tennessee. To date, we have not received your survey but we do want you to know that your response is very important to us. Please help ensure that our research on perceptions of job stress in healthcare adequately represents all segments of the field by returning your completed survey by June 28. HCA has given their endorsement of this project.

Dan Gilbert, Ph.D. Candidate
Dr. Ernest W. Brewer,
Professor and Chair of Doctoral Committee
The University of Tennessee
(865) 974-4466

P.S. If you have already returned the survey, please accept our thanks.

APPENDIX L

HEALTH OCCUPATIONS STRESS SCALE

FINAL VERSION

Subscale	Item
Job Demands	There is not sufficient time to take rest periods and meal breaks.
	The expectations regarding my assignments are excessive.
	My is physically demanding.
	Patients are brought to my department for treatment/tests when we are already busy.
	My job is mentally demanding.
	I spend too much time trying to keep up with the workload.
	We receive new patients in my department just before quitting time.
	I care for critically ill or injured patients who may die.
Interpersonal Conflicts	I experience conflicts with physicians.
	I experience conflicts with coworkers.
	Physicians are disrespectful.
Home-Work Balance	My work places a great demand on my family.
	I am tired when I wake up.
	I have to balance job demands and home demands.
Regulatory Complexity	I spend more time on accreditation or regulatory issues than taking care of patients.

Subscale	Item
	I keep up with records required for accreditation or regulatory reasons.
	I attend meetings required for accreditation of regulatory reasons.
	I supervise the assignments of others.

VITA

Daniel L. Gilbert was born in Louisville, Kentucky, in 1956 and raised in Baltimore, Maryland. He moved to Cleveland, Tennessee, in 1980 to enroll at Lee College, where he earned a bachelor of science in psychology in 1984. He was recipient of the behavioral and social sciences department award his senior year. During his four years at Lee College, he worked part time at Bradley Memorial Hospital. Upon graduation, he was given the opportunity to establish a personnel department for the hospital, and helped to expand employee benefits and services over the next 16 years. He joined the Tennessee chapter of the American Society for Healthcare Human Resources Administration (ASHHRA).

In 1988, Dan completed a master of business administration degree from the University of Tennessee at Chattanooga. Between 1993 and 2001, he received seven national communication awards presented by ASHHRA, and received the chapter president's award for outstanding leadership in 1998. He also became board certified in healthcare management by the American College of Healthcare Executives in 1998. In 2001, he was recipient of the ASHHRA mentorship award.

Dan presently serves as vice president of human resources for Parkridge Medical Center in Chattanooga, Tennessee, and is an adjunct faculty member of Lee University business department. He is a conference speaker on human resources and management topics, and his work has been featured in two healthcare books. He and his wife Betsy have three children, Sarah, Leah, and Adam.