

OCCUPATIONAL STRESS AND BURNOUT AMONG RADIOLOGIC SCIENCE
EDUCATORS

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ABSTRACT

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OCCUPATIONAL STRESS AND BURNOUT AMONG RADIOLOGIC SCIENCE EDUCATORS

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The purpose of this study was to examine the perceived level of occupational stress and burnout of radiologic science educators. This was a survey study using a convenience sample. The sample consisted of 241 radiologic science educators. The Maslach Burnout Inventory with health status and demographic survey was emailed to members of the Association of Educators in Radiologic Science. Independent samples t-tests, regression analysis, and one-way ANOVAs were used to compare data. Results indicated radiologic science educators were average in their feelings of emotional exhaustion, low in their feelings of depersonalization, and average in their feelings of personal accomplishment. Also, a statistically significant result was found between all three subscales of the MBI and the reported health status. This research study may help raise awareness of both stress and burnout and the relationship it has to the health of radiologic science educators.

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CHAPTER ONE

INTRODUCTION

Occupational stress can result in adverse health effects, low productivity, and burnout among people from several professions (Strazdins, D'Souza, Lim, Broom, & Rodgers, 2004). The term "burnout" has been used to explain the effects of constant stress on a person (Vance, Miller, Humphreys, & Reynolds, 1989). Teaching was once viewed as a satisfying career with low job related stress. However, over the past several decades teaching has evolved into a stressful occupation (Griva & Joeke, 2003).

Research among university faculty suggests that occupational stress is increasing and wide spread (Winefield, 2003). In a study of 158 randomly selected university instructors, 66% reported having stress at work for at least 50% of the time (Blix, Cruise, Mitchell, & Blix, 1994).

At the time of this writing, no research studying the effects of stress on radiologic educators has been conducted. Currently the field of radiology is experiencing a shortage of radiologic technologists and radiologic educators (American Society of Radiologic Technologists [ASRT], 2004). The U.S. Bureau of Labor Statistics (2004) has projected the field to grow faster than the average growth of all occupations. The American Society of Radiologic Technologists (2004) estimates an additional 72,000 radiographers will be needed between the years 2002-2012. They also project only 61,742 new radiographers

will be available between the years 2002-2012; approximately 14% short of the estimate needed.

There are 591 accredited radiography programs (Joint Review Committee on Education in Radiologic Technology [JRCERT], 2005). Radiologic professional societies are pressuring these radiologic programs to accept additional students to meet the needs of the profession. School administrators view the shortage as a way to increase enrollment. A study conducted by the American Society of Radiologic Technologist (2004) reported that 66% of radiographic programs have difficulty recruiting new faculty. To compound this problem, by 2009 the Joint Review Committee on Education in Radiologic Technology will require that program directors hold a master's degree. Presently, only 51% of program directors have master's degrees (JRCERT, 2005). This requirement will place unique stress on educators in radiologic science.

Statement of the Purpose

Does stress have a negative impact on the health and longevity of radiologic faculty? The purpose of this study was to examine the perceived level of stress of radiological faculty. The study focused on the effect burnout has on "emotional exhaustion" (fatigue or stress), "depersonalization" (feelings of callousness or indifference in regard to students), "personal accomplishment" (feelings of enthusiasm and effectiveness in working with people), and stress related health problems (Maslach & Jackson, 1981). This research study may help raise awareness of stress and the relationship it has to the health of radiologic educators.

Hypotheses

The following hypotheses were tested in this study.

1. There will be no statistically significant effects of age, gender, education level, or number of years worked on stress scores as measured by the Maslach Burnout Inventory.
2. Emotional exhaustion as measured by the Maslach Burnout Inventory will not predict adverse health effects as measured by the self reported health status questionnaire.
3. Depersonalization as measured by the Maslach Burnout Inventory will not predict adverse health effects as measured by the self reported health status questionnaire.
4. Lack of personal accomplishment as measured by the Maslach Burnout Inventory will not predict adverse health effects as measured by the self reported health status questionnaire.
5. There will be no statistically significant difference between radiologic science educator scores and Maslach Burnout Inventory national norms.
6. There will be no statistically significant difference between radiologic science educator scores and clinical practice radiographer scores as measured by the Maslach Burnout Inventory.

Delimitations

The following was a delimitation of this study.

1. The participants of this study only included Radiologic science educators who belonged to the Association of Educators in Radiological Sciences.

Limitations

The following were limitations of this study.

1. Participants varied in level of education from Associate Degree to Doctoral degree.
2. Although all participants were educators, they taught in different settings such as hospital based programs, college based programs, university based programs, and proprietary programs. Occupation stress and burnout levels may vary due to the educational setting.
3. This was a sample of convenience chosen from a large, nation wide membership and readily accessible distribution list.
4. The Educator version of the Maslach Burnout Inventory was used but radiologic science educators may have unique experiences and the results may not be generalizable to educators of other disciplines.
5. The Educator version of the Maslach Burnout Inventory was used in this study with questions added by the researcher regarding health status. This instrument has not been used with Radiologic science educators and with the added questions, the validity of the instrument may be altered.
6. The survey instrument was delivered electronically which might be an influencing factor in who responded.

Assumptions

The following were assumed in this study.

- Participants answered the survey truthfully and to the best of their ability.

- The Maslach Burnout Inventory Instrument performed similarly in the population under study as those previously used.
- The questions were interpreted uniformly by all participants.

Definition of the Terms

Adverse health effect – characteristics that indicate declining health such as: heart disease, hypertension, and gastrointestinal problems.

Burnout – “a prolonged response to chronic emotional and interpersonal stressors on the job, and is defined by the three dimensions of exhaustion (emotional exhaustion), cynicism (depersonalization), and inefficacy (personal accomplishment)” (Maslach, Schaufeli, & Leiter, 2001, p.397).

Depersonalization – “an unfeeling and impersonal response toward recipients of one’s care or service” (Maslach & Jackson, 1981, p. 101).

Emotional exhaustion – “feelings of being emotionally overextended and exhausted by one’s work” (Maslach & Jackson, 1981, p. 101).

Occupational Stress – aspects of the work environment that cause strains, poor psychological health, or well-being of the individual (Behr, 1995; Kahn & Byosiere, 1992).

Personal accomplishment – “feelings of competence and successful achievement in one’s work with people” (Maslach & Jackson, 1981, p. 101).

Importance of the Study

This study establishes a baseline level of burnout experienced by radiography educators and its effect on their health. No work has yet been done in this area. Based on the results of this study, future work to determine the causes and potential interventions to reduce the effects of stress and burnout on this population could be conducted. This study also provides a starting point for health education efforts in this underserved population.

CHAPTER TWO

REVIEW OF THE LITERATURE

A review of the literature was conducted through Texas Woman's University and Midwestern State University Libraries to access Firstsearch and EBSCOhost interfaces respectively. Using the databases WorldCat, ArticleFirst, ECO, Academic Search Premier, CINAHL, and MEDLINE four sets of search terms were used. Searches were conducted without search limitations. The first search using "burnout" AND "education" yielded 1772 articles. The second search using "occupational stress" AND "education" generated 801 articles. The third search using "burnout" AND "occupational stress" AND "education" identified 54 articles. The fourth search using "Maslach Burnout Inventory" AND "education" produced 246 articles. The National Institute for Occupational Safety and Health web site was searched using the terms "occupational stress" AND "burnout" yielded 37 articles. Radiography journal articles were also retrieved from Midwestern State University's library periodical holdings. Abstracts of all the articles were reviewed and evaluated with the following criteria. To be selected articles had to be peer reviewed, deal with education faculty members or healthcare workers, in English, and substantial research studies. Using the above criteria 53 unduplicated articles were selected for this chapter. After reading the articles eight additional articles were identified from reference lists. In total, 61 articles were used.

From this body of literature five content areas were identified. First, a history of both occupational stress and burnout will be discussed. Second, causes, definitions, and consequences of both occupational stress and burnout will be investigated. Third, the impact of both occupational stress and burnout on the industry will be explored. Fourth, will be a discussion of the impact of both occupational stress and burnout on the individual. Then, to complete this chapter the effects of both occupational stress and burnout by demographics will be considered.

History of Occupational Stress and burnout

Both occupational stress and burnout has been a subject of researchers for many years. Understanding the effects of occupational stress and burnout on individuals and organizations has been the driving force (Michailidis & Asimenos, 2002). Research on stress, as we know it today, began in the 1930's by Dr. Hans Selye (Adams, 1999; Clegg, 2001; Polworth, 1985; Selye, 1978). He found that stress occurs when the body does not consume excess energy and named this phenomenon the General Adaptation Syndrome (Selye, 1978). This syndrome has three stages: alarm reaction, stage of resistance, and stage of exhaustion. Stage one is the alarm reaction or "fight or flight". During this stage the body is reacting to acute stress it is faced with. Common responses of the body involve the sympathetic nervous system and the hypothalamic-pituitary-adrenal axis (McEwen, Flier, & Underhill, 1989; McEwen, 2005; Selye, 1978). The nerves and adrenal medulla produces catecholamines (epinephrine [adrenaline] and norepinephrine), adrenal cortex produces glucocorticoids (cortisol), and corticotrophin from the pituitary.

This results in raised heart rate, faster reaction, higher blood pressure, raised blood sugar levels, and blood being diverted from the digestive system. The release of these chemicals helps the body to react and return to homeostasis which leads to the second stage of resistance. If the stressor persists it will lead to the final stage of exhaustion and can result in illness. McEwen's (1989; 2005) research coined the term "allostasis". The definition of allostasis is the adaptive process to maintain homeostasis through the body's production of these chemical messengers mentioned above to promote adaptation in the aftermath of acute stress. If stressor persist and becomes chronic it can create allostatic overload which contributes to the wear and tear on the body and brain from being subjected to chronic stress. Chronic stress creates excessive levels of cortisol in the brain impairing the function of the hypothalamus and affecting the immune system by increasing sympathetic activity and decreasing cellular immunity. This can create long term damage to the body by increasing the risk of coronary artery disease, high blood pressure, atherosclerosis, myocardial infarction, diabetes, and obesity.

Early investigations on burnout were conducted in the 1970's by Freudenberger, a psychiatrist working in health care, and Maslach, a social psychologist studying emotions in the workplace (Angerer, 2003; Gold & Bachelor, 1988; Maslach, Schaufeli, & Leiter, 2001). Freudenberger characterized burnout in physical and behavioral terms and Maslach described it as a multidimensional phenomenon including emotional exhaustion, depersonalization, and personal accomplishment (Dorman, 2003; Gillespie & Numerof, 1991).

Causes, Definitions, and Consequences of Burnout and Occupational Stress

From this literature search multiple definitions and causes of both occupational stress and burnout were identified. The general consensus is that stress is the body's response to situations perceived as demanding or exceeding one's resources (Adams, 1999; Doyle & Hind, 1998; French, 2004; Michailidis & Asimenos, 2002; National Institute for Occupational Safety and Health [NIOSH], 1999). Excessive stress can lead to physiological and psychological damage particularly when an imbalance exists between external and internal demands and the body's ability to cope. To be healthy, the body needs to maintain homeostasis (Kinman, 2001; Polworth, 1985; Selye, 1978). Burnout is the body's response to exposure to long periods of emotional and interpersonal stressors on the job and is viewed as emotional, physical, and attitudinal exhaustion (Kyriacou, 2001; Maslach, 2003; Maslach et al., 2001; Pennington & Ho, 1992; Schwab, Jackson, & Schuler, 1986; Sciacchitano, Goldstein, & DiPlacido, 2001; Vance, Miller, Humphreys, & Reynolds, 1989).

Those outside the education profession might perceive that teachers/professors have non-demanding, trouble-free, and low stress jobs. The reality is teaching has evolved into a complex and stressful occupation (Schwab et al., 1986; Vance et al., 1989). Research over the last 25 years has demonstrated that teaching is a highly stressful occupation with elevated rates of burnout (Maslach et al., 2001; Mearns & Cain, 2003; Verhoeven, Kraaij, Joekes, & Maes, 2003) and that professors experience stress daily (Griva & Joekes, 2003).

Sources of burnout are exhaustion (work overload), feelings of cynicism (social conflict), and detachment (ineffectiveness and lack of accomplishment) (Dorman, 2003; Maslach et al., 2001; Maslach, 2003). Exhaustion is a basic response to stress. Cynicism is not indicated with traditional job stress in current literature (Maslach et al., (2001). Research related to burnout shows a significant statistical correlation between exhaustion and cynicism which emerges from work overload and social conflict. Detachment is positively related to a lack of resources to perform one's job (Maslach et al., 2001).

Two studies (Mak & Muller, 2001; Maslach & Leiter, 1999) cite causes of burnout as downsizing/restructuring, feelings of insecurity, and an undervaluing of employees. A study from the National Institute for Occupational Safety and Health (Pepper & Messinger, 2000), report downsizing and reorganization affect both workers who lose their jobs and those who retain their jobs negatively. Job survivors were found to have reduced job commitment, low morale, low job satisfaction, and feelings of guilt, sadness, and worry.

Corporate executives seem to believe both occupational stress and burnout lies with employees and their attitude problems (Maslach & Leiter, 1999). However, research over the past 20 years indicates that both occupational stress and burnout are due to the organizational environment and not individuals. In one study, Gmelch, Lovrich, and Wilke (1984) queried 1200 faculty from 80 universities to explore the stressors of educators. They found 60% of educator stress was related to the work environment. The

National Institute for Occupational Safety and Health (1999) reports stressful working conditions can directly influence worker safety and health.

There are different ways that the environment manifests itself and influence both occupational stress and burnout of educators. First, time management is a major concern. Several studies indicated educators feel overloaded with job tasks which include efforts to stay current in their field, course preparation, and assignment overload (Doyle & Hind, 1998; Oginska-Bulik, 2005; Vance et al., 1989; Yiu-Chung & Kwok-Bun, 2000). Together these can interfere with their personal life. Second is the conflict between personal and departmental/institutional goals (Doyle & Hind, 1998; Griva & Joeques, 2003; Howard & Johnson, 2002; Mearns & Cain, 2003; Oginska-Bulik, 2005; Schwab et al., 1986; Vance et al., 1989; Yiu-Chung & Kwok-Bun, 2000). This includes lack of rewards, autonomy, resources, support and social interactions, respect, and involvement with decisions. Ultimately, these can lead to personal dissatisfaction or unmet expectations. In addition to these, some studies listed inadequate pay for educators as a primary stressor (Doyle & Hind, 1998; Gmelch, et al., 1984; Vance et al., 1989). Another important environmental factor that affects educators is student interactions (Howard & Johnson, 2002; Kyriacou 2001). Educators not only have to teach students but may have to advise, recruit, discipline, motivate, and resolve conflicts. Finally, many educators deal with pressure from administration to conduct research, publish, and secure grants to fund programs and research (Doyle & Hind, 1998; Gmelch, et al., 1984).

Radiologic Science professionals experience much of the same occupational stress and burnout as other professionals. One such area is conflict between personal and departmental/institutional goals. This includes having little control over procedures performed, performing repetitive tasks, resolving departmental issues, and performing unnecessary exams (French, 2004; Polworth, 1985; Sciacchitano et al., 2001; Teters, 2004). Research demonstrates that Radiologic Technologists feel overworked and a primary cause of this stress tends to be due to staffing shortages in the profession (Edge, 2002; Sciacchitano et al., 2001; Teters, 2004). Other studies discussed areas that deal with relationships and the main concern is lack of respect from physicians, administration, and other health care workers (Polworth, 1985; Sciacchitano et al., 2001; Teters, 2004). In addition, French (2004) identified several relationship issues that can cause stress for Radiographers, including patient, professional, and interpersonal relationships. Lastly, inadequate pay for Radiologic Technologists has been identified as a stressor (Sciacchitano et al., 2001).

Both occupational stress and burnout can impact individuals personally and professionally. The majority of adults may spend their life at work and it is important to identify circumstances and potential outcomes that could be harmful. Educators draw on physical, emotional, and intellectual resources to be effective (Croom, 2003). Many teachers consistently work over a 40 hour week to meet the demands of the job. The combination of these demands can lead to health problems which can affect the physical and psychological health of individuals (Croom; Hunter & Houghton, 1993; Michailidis

& Asimenos, 2002; Stein, 2001; Strazdins, D'Souza, Lim, Broom, & Rodgers, 2004; Williams, 2003). Also, both occupational stress and burnout can affect a teacher's commitment to the classroom and profession (Schwab et al., 1986; Wisniewski & Gargiulo, 1997). This can lead to detachment, alienation, cynicism, apathy, absenteeism, and ultimately leaving the profession (Guglielmi & Tatrow, 1998; Mearns & Cain, 2003; Schwab et al.; Wisniewski & Gargiulo). Disturbances in equality (between educator and work) can lead an individual to find a balance between investments and benefits (Taris, Schreurs, Van Iersel-Van Silfhout, 2001; Taris, Van Hom, Schaufeli, and Schreurs, 2004). This inequity can result in a person lowering their investment which will affect commitment to students (Taris et al., 2001; Taris et al., 2004; Schwab et al; Wisniewski & Gargiulo). An educator with occupational stress and burnout will display the following characteristics: lack of enthusiasm, not responsiveness to students, will not encourage students to learn, uninteresting, unapproachable, unimaginative, and avoid student contact (Taris et al., 2004; Stern & Cox, 1993).

Occupational stress affects individuals differently. Some find it challenging and others, in the same setting, will find it overwhelming (Hunter & Houghton, 1993; NIOSH, 1999; Stein, 2001). Both occupational stress and burnout contribute to disease, injury, violence, lower productivity, and absenteeism (Michailidis & Asimenos, 2002; Stein). The personal effects of both occupational stress and burnout will be explored first.

Strazdins et al. (2004) researched job pressures of 1,188 managers and professionals (including education). They examined five categories of job pressure: low,

moderately low, moderate, high, and extremely high. Results found 10.7% reported extremely high or high job pressure, 51.4% reported moderate and moderate low job pressure, and 38% reported low job pressure. Hunter and Houghton (1993) studied the effects of stress on 95 nurse educators. Their results indicated 87% experience emotional exhaustion at moderate or high levels, 49% reported high frequency of depersonalization, and 95% reported feeling a lack of personal accomplishment. Only 38% of the educators indicated they were in good health.

There are numerous health symptoms related to both occupational stress and burnout. Early warning signs of job stress include headache, sleep disturbances, difficulty in concentrating, short temper, upset stomach, job dissatisfaction, and low morale (NIOSH, 1999). Table 1 identifies health symptoms found from the literature review for this chapter.

Table 1

Health Symptoms Identified from Literature Review

Article	Health symptom(s) identified
Stacciarini & Troccoli, 2004	anxiety, insomnia
Stein, 2001	heart disease, stroke, arthritis, duodenal ulcers
Oginska-Bulik, 2005	anxiety, insomnia, depression
Collins, 2001	heart disease
Torkelson & Muhonen, 2004	headaches, insomnia, faintness/dizziness, pounding/racing heart
Mak & Mueller, 2001	Indigestion, headaches, persistent cough

Williams, 2003	headaches, gastrointestinal disturbance, hypertension, peptic ulcers, irritability
Chan, 2002	anxiety, insomnia
Michailidis, & Asimenos, 2002	hypertension, coronary heart disease, rashes, digestive and gastrointestinal problems
Taris, Schreurs, & Van Iersel-Van Silfhout, 2001	cardiovascular
Gillespie, Walsh, Winefield, Dua, & Stough, 2001	headaches, sleep disorders, back and neck pain, muscle tension, weight loss or gain, physical fatigue, lowered immunity to colds and viruses, hypertension, heart problems, skin disorders
Vance, Miler, Humphreys, & Reynolds, 1989	increase blood pressure, feeling heart race or pound, rapid shallow breathing, stomach ache, stomach cramps, stomach pain
Adams, 1999	trouble sleeping, stomach ache, headaches
Hunter & Houghton, 1993	sleep disorders, headache
Firnian, 1984	increase blood pressure, feeling heart race or pound, rapid shallow breathing, stomach ache, stomach cramps, stomach pain
Polworth, 1985	coronary heart disease, insomnia, headaches, increased blood pressure, gastrointestinal disturbance
Collins & Nolen, 2002	heart palpitations, fast pulse, difficulty breathing, muscle tension, anxiety, heartburn, gastrointestinal disturbance, rashes, sleeping disorders
Jamal & Molson, 2004	headaches, upset stomach, gas, and bloated, trouble sleeping, anxiety

Impact of Burnout and Occupational Stress on the Industry

The impact of both occupation stress and burnout not only affects individuals but also the organization. Today's workforce is encountering occupation stress and burnout at epidemic proportions and is a major concern in the health occupations (Collins & Nolen, 2002). Healthcare vocations report high turnover rates and this can be attributed to

burnout (Penny, 2005). Retention is a concern for many employers. The U.S. Department of Labor reports there will be a 21% - 35% shortage of professionals in imaging sciences through 2010 (Teters, 2004). Stress induced burnout of health professionals may lead to individuals leaving the profession. This will certainly affect the current shortages already being experienced in many allied health professions (Sechrist & Frazer, 1992).

Between 2001 and 2003, 13.5 million workdays were lost due to work related stress (Williams, 2003). Both occupation stress and burnout affect the physical and psychological health of individuals and can result in economical loss to organizations (Hunter & Houghton, 1993). The estimated cost associated with stress in 1994 was \$4,724 per employee per year and today that figure would be even greater (Morrall, 1994). Currently job related injuries cost employers \$120 billion annually and many of these are related to job stress (Stein, 2001). Of these costs, \$60 billion result from stress related illness and \$32 billion from stress related work accidents (Sechrist & Frazer, 1992). Stress disorders also cost about \$150 billion annually due to absenteeism, decreased productivity, and disability (Pelletier & Lutz, 1988). The majority of this cost can be attributed to the treatment of stress and burnout related symptoms (Penny, 2005).

Impact of Burnout and Occupational Stress on the Individual

Both occupational stress and burnout not only affect individuals, but also their home life and family (Williams, 2003). In a study conducted by Michailidis and Asimenos (2002), faculty and administrators identified relationships outside of work, interactions between work and home life, and career/achievement as sources of stress. They also

found higher than normal levels of physical and mental ill health due to stress among participants. Both occupational stress and burnout are associated with poor health in teachers regardless of the type of measurement instrument used (Guglielmi & Tatrow, 1998). Burnout not only affects the teacher but the students; which can have a negative impact on the learning environment (Guglielmi & Tatrow ; Stern & Cox 1993). In a study of 131 educators and staff at a university, anxiety and withdrawal behaviors were the most prominent with those who reported having few resources and/or high job demands (Taris et. al., 2001). This study also found that the higher that the number of students in class, the higher perceived job demand. Both occupational stress and burnout is found to be more common among those at the bottom of the work hierarchy due to less control over their work (Williams). It is estimated that 75%-90% of all doctor visits are related to stress and that 112 million people take medications each week due to stress related problems (Collins & Nolen, 2002). Stress and burnout consequences can result in negative physical, psychological, behavioral, and organizational problems (Blix, Cruise, Mitchell, & Blix, 1994).

Effects of Burnout and Occupational Stress by Demographics

The effects of the interactions between demographics and occupational stress and burnout should also be considered. Demographic areas that were identified in the literature search are: age, gender, status (job, education, and marital), and ethnicity. Of the demographic variables interacting with both occupation stress and burnout, age is the most consistently noted characteristic (Maslach et. al., 2001). Within the profession of

educators, research demonstrates that younger faculty experience more stress and burnout than older faculty (Lee & Wang, 2002; Maslach et. al.). The primary difference between age groups may be due to lack of experiences (Croom, 2003; Goldenberg & Waddell, 1990; Lee & Wang; Lease, 1999), although this was not the case in all research studies. Chan (2002) studied 83 educators and found no statistically significant relationship between stress and age. In radiologic science professionals, research demonstrated that older more experienced radiographers reported less stress and burnout than the younger less experienced radiographers (Sciacchitano et. al., 2001).

Maslach (2001) contends that gender is not a consistent predictor of occupational stress and burnout. In Chan's (2002) study of 83 educators, he found no difference in occupational stress and gender. The same was found in Vance and associates (1985) research of educators. The opposite was found in several other studies. A study of 330 human services professionals, which included educators, reported that women expressed poorer health and greater stress than men (Oginska-Bulik, 2005). A study of three universities (n-131), found that new female faculty experienced more stress than new male faculty (Lease, 1999). A study of 70 faculty members from eight universities reported that women experienced higher levels of stress than men (Goldenberg & Waddell, 1990). A large European study (n-582) reported that women had overall greater levels of stress than men (Doyle & Hind, 1998). One survey by the National Institute for Occupational Safety and Health (n.d.), reported that 60% of women listed stress as their top problem at work. Job conditions contributing to women's stress are workload

demands, little input over work, conflict, job insecurity, poor work relationships, job insecurity, repetitive work, sexual harassment, and balance of work and family.

Both occupational stress and burnout may also be affected by an individual's job rank. In universities with tenure tracks, it is reported that non-tenured faculty experience more stress than tenured faculty (Goldenberg & Waddell, 1990; Lease, 1999). One study reported that higher level positions resulted in greater stress for women (Doyle & Hind, 1998). Also, an individual's education level may play a role in burnout. Individuals with higher education levels seem to have higher burnout rates than those with less education (Lee & Wang, 2002; Maslach et al., 2001). Marital status has been reported as having a negative effect on stress and burnout. Maslach et al. (2001) reported that unmarried individuals (especially men) experienced more stress and burnout than those who were married. The researchers also expressed that singles experienced even higher rates of stress and burnout than those who were divorced.

Maslach et al. (2001) reported that very few studies have addressed ethnicity and burnout. One study of 30 teachers at a Native American school found no differences between Native American and White teachers in regard to stress (Vance et al., 1985).

Summary

The definition of occupational stress is the body's response when the requirements of the job do not match the resources of the worker (Adams, 1999; Doyle & Hind, 1998; French, 2004; Michailidis & Asimenos, 2002; NIOSH, 1999). Burnout occurs when an individual is exposed to stress over long periods of time (Kyriacou, 2001;

Maslach, 2003; Maslach et al., 2001; Pennington & Ho, 1992; Schwab et al., 1986; Sciacchitano et al., 2001; Vance et al., 1989). A consequence of stress is burnout that may cause an individual to leave their profession. Sources of burnout are work overload, social conflicts, and lack of resources (Dorman, 2003; Maslach et al., 2001; Maslach, 2003). Educators are not immune to stress and burnout. Teaching has evolved into a complex and stressful occupation (Schwab et al., 1986; Vance et al., 1989).

Stress impacts every area of an individual's life, professional and personal. Stress also seems to manifest itself in several common health symptoms such as hypertension, heart disease, and gastrointestinal problems (Fimian, 1984; Michailidis, & Asimenos, 2002; Polworth, 1985; Vance et al., 1989).

The effects of stress on industry are also obvious. It costs billions of dollars annually in lost productivity and other tangible effects. There are also costs in terms of medical expense and health effects. Within education, the learning environment is effected as well. Because the health of educators and the quality of education are both at risk, it is important to understand both occupational stress and burnout in this group.

CHAPTER THREE

METHODOLOGY

This chapter describes the methodology that was used to conduct research on the perceived level of occupational stress, burnout, and health of radiologic science educators. An electronic version of the MBI-Educators Survey was used along with a health status questionnaire. A link to these instruments was emailed to members of the Association of Educators in Radiologic Science. This population was selected to complete the survey because it provided a large cross section of educators located throughout the United States.

Population and Sample

This study used a sample of convenience. Following approval by Midwestern State University and Texas Woman's University Institutional Review Board, an electronic mailing list of all 426 members of the Association of Educators in Radiologic Science was obtained with permission from the organization (appendix A). A link to an electronic version of the Maslach Burnout Inventory with health status questions added was emailed to all members on the list with an introductory statement. The introductory statement (Appendix B) described the purpose of the study, consent to voluntarily participate, procedure to participate, any potential risks involved, potential benefits of the

study to the profession, confidentiality statement, rights of the participants, and identity of the author of the study. A follow up email reminder was sent two weeks later. After follow up a total of 241 surveys were completed giving a 62% response rate.

Protection of Human Subjects

This study was approved by the Human Subjects Review Committee at Midwestern State University, File number 01520701 (Appendix C). The study was exempted from a full review by the following federal regulations and/or university policy:

It is limited to the collection and study of obtained data using only the following techniques AND the data or information obtained will be recorded in such a manner that subjects cannot be identified, directly or indirectly, through identifiers linked with the subjects. Data will be obtained using survey or interview procedures.

It is limited to the collection and study of data obtained by using survey or interview procedures, AND: the information collected about the subjects' behavior DOES NOT INVOLVE sensitive subjects such as illegal or immoral conduct, drug or alcohol abuse, sexual behavior, mental illness, or other possible personally embarrassing subjects, AND the information collected about subjects, if it became known to outsiders, could not reasonably be expected to place the subject at risk of civil or criminal

liability, or be damaging to the subjects social or financial standing or employability (Midwestern State University, n.d., Attachment A Claim for exemption, p. 1-2).

Due to the author's position as a faculty member at Midwestern State University IRB approval was required from this university. A request was submitted to the Texas Woman's University Institutional Review Board to accept Midwestern State University's approval. The request was made to avoid duplication of approvals and was granted (appendix D).

Data Collection Procedures

The electronic version of the Maslach Burnout Inventory with health status and demographic questions through SurveyMonkey.com was emailed to all participants on the membership list obtained from the Association of Educators in Radiologic Sciences. A follow-up email was sent two weeks later encouraging response to the survey. Data was downloaded from SurveyMonkey.com and entered into SPSS for Windows for analysis.

Information collected from this study will remain confidential. Findings of the study will be kept for a total of five years in a secure location and then destroyed. A feature of SurveyMonkey.com is that the participants and their institutions remained anonymous. Only the author of the study reviewed the collected data.

Instrumentation

Permission to use the Maslach Burnout Inventory instrument was purchased from CCP, Inc. for 426 surveys. The instrument was entered into SurveyMonkey.com along with health status and demographic questions (Appendix E). Validity and reliability of the MBI instrument is established. Maslach and Jackson's (1996) measure of internal consistency yielded a Cronbach's alpha coefficient of .90 for emotional exhaustion, .79 for depersonalization, and .71 for personal accomplishment. The instrument has been used numerous times and demonstrates a high degree of internal consistency of constructs. The construct validity of the Maslach Burnout Inventory has been established through extensive research and use (Akroyd, Caison, & Adams, 2002). The MBI instrument is divided up into three sub scales Emotional Exhaustion, Depersonalization, and Personal Accomplishment (Maslach & Jackson). Questions for the MBI are based on a 0 to 6 Likert scale where 0 = never, 1 = a few times a year, 2 = once a month or less, 3 = a few times a month, 4 = once a week, 5 = a few times a week, and 6 = everyday. Emotional Exhaustion subscale consists of nine items (questions 7, 8, 9, 12, 14, 19, 20, 22, and 26) describing feelings of being emotionally overextended and exhausted by one's work. The Depersonalization subscale has five items (questions 11, 16, 17, 21, and 28) describing an unfeeling and impersonal response towards recipients of one's care or service. For both Emotional Exhaustion and Depersonalization subscales items are negatively worded. A higher mean score in each of these subscales correspond to higher degree of experienced burnout. The Personal Accomplishment subscale consists of eight

items (questions 10, 13, 15, 18, 23, 24, 25, and 27) describing feelings of competence and successful achievement in one's work with people. It is important to note that items in this subscale are positively worded and a lower mean score indicates a higher degree of experienced burnout.

The health status questionnaire was created by identifying common health symptoms noted in a literature review of both occupational stress and burnout. Health symptoms were included only if the symptoms were reported in two or more articles. Questions for the health status questionnaire are based on a 0 to 6 Likart scale where 0 = never, 1 = a few times a year, 2 = once a month or less, 3 = a few times a month, 4 = once a week, 5 = a few times a week, and 6 = everyday. A higher mean score for each question corresponds to higher degree experienced of the particular health symptom. After the health status questionnaire was created, content validity was established using a panel of Radiologic Science experts. The following Radiologic Science experts were used: Nadia Bugg, PhD., R.T.(R); Robert Comello, M.S., R.T.(R); James Johnston, M.S.R.S., R.T.(R)(CV); Gary Morrison, M.Ed., R.T.(R), Sheree Phifer, M.H.S., R.T.(R); Meg Rollins, B.S., R.T.(R)(N); Beth Veale, M.Ed., R.T.(R)(QM); Ray Villarreal, B.S.R.S., R.T.(R); Lynette Watts, M.S.R.S., R.T.(R), and Donna Wright Ed.D., R.T.(R). Based on their input, only minor editorial changes were made. Reliability was established via a test re-test procedure involving ten radiologic science faculty. The health status questionnaire was distributed to the faculty members with a two week interval between the first and

second administration of the questionnaire. A correlational coefficient of .95 was obtained establishing a high degree of reliability (Appendix F).

Data Analysis

A mean score was calculated for each of the three subscales of the Maslach Burnout Inventory and then an overall mean score for the study group. These mean scores were first compared to national norms, provided with the instrument, using an independent samples t-test. The group mean was then compared to a group mean score reported in a large study of clinical practice radiographers to identify any differences that may exist between clinical practice radiographers and radiography educators. An independent samples t-test was used.

A Regression analysis was used to identify any relationships between the stress level as determined by the Maslach Burnout Inventory instrument and the self reported health status. Finally, one-way ANOVAs were used to analyze the effects of age, gender, education level, number of years worked, and self-reported health status on each of the three subscales of the Maslach Burnout Inventory instrument. The three subscales: emotional exhaustion, depersonalization, and personal accomplishment, were analyzed separately looking for any significant effects of the above named factors on each.

Summary

Radiologic science educators located across the United States were administered a survey consisting of demographic, Maslach Burnout Inventory, and health status questions. IRB approval was granted from Midwestern State University to insure

protection of the subjects of the study. Participants of the study answered questions electronically from SurveyMonkey.com. Data from the survey was downloaded and entered into SPSS for statistical analysis. Results were compared to national educator norms, clinical practice radiographers mean scores, and self reported health status. The uniqueness of this study is that it provides a baseline level score of burnout experienced by radiography educators and its effect on their health. At the time of this research no other studies had been identified for this population.

CHAPTER FOUR

RESULTS

Raw Data

Data were collected using an electronic version of the Maslach Burnout Inventory (MBI), a health status questionnaire, and a demographics questionnaire through Surveymonkey.com. An introductory email with a link to the survey was sent to 426 educators throughout the United States. The email addresses were obtained, with permission, from the Association of Educators in Radiologic Science. Thirty seven of the email addresses were no longer valid and emails were returned to the researcher. A follow up email reminder was sent two weeks later. After follow up, a total of 241 surveys were completed giving a 62% response rate from the valid email addresses.

After the return deadline passed, the data were downloaded from Surveymonkey.com as an Excel file. This file was then imported to SPSS Graduate Pack 12.0 for Windows for statistical analysis. Data were numerically recoded for quantitative test procedures. For each of the three subscales of the MBI, participant raw scores were calculated and the other variables labeled and organized for testing.

Descriptive Statistics

The participants in this study were 72% female and 28% male ($n = 241$). The average age was 48 years. Eighty-four percent of the participants taught full time and 16 percent taught part time. The gender distribution was consistent between full-time and

part-time participants. The average number of years experience as an educator was 15. Regarding the highest level of education, 2.5% held a hospital certificate, 6.6% held an associate's degree, 27.4% held a bachelor's degree, 52.7% held a master's degree, and 10.8% held a doctoral degree. Twenty-three percent of participants taught in a hospital based setting, 38% were at a community college, 31% were at a university, and 8% were in a proprietary setting. The results of the MBI indicate that radiologic science educators were average in their feelings of emotional exhaustion, low in their feelings of depersonalization, and average in their feelings of personal accomplishment based on MBI subscale score ranges. Radiological Science educators reported the top three responses for medications taken were for headaches, heartburn, and increased blood pressure respectively. The top three responses of reported family history health were increased blood pressure, heartburn, and (tied for third) headaches and gastrointestinal disturbances. Appendix G details the raw results of each MBI and health status question of the survey.

Hypotheses Testing

A mean score was calculated for each of the subscales of the MBI: Emotional Exhaustion (EE), Depersonalization (Dp), and Personal Accomplishment (PA). These mean scores were then compared to the national norm subscales as reported in the Maslach Burnout Inventory Manual (Maslach, Jackson, & Leiter, 1996) using an independent samples t-test. The norms were based on responses from 11,067 educators and healthcare workers. The result of the EE comparison was statistically significant

with a 95% confidence interval $t(240) = -2.38, p < .05$. Radiologic science educators expressed less emotional exhaustion than the national norm. The result of the Dp comparison was statistically significant with a 95% confidence interval $t(240) = -12.29, p < .05$. Radiologic science educators expressed less depersonalization symptoms than the national norm. The result of the PA comparison was statistically significant with a 95% confidence interval $t(240) = 7.93, p < .05$. Radiologic science educators reported greater feelings of personal accomplishment than the national norm.

The participant mean scores were then compared to mean scores of a large study of clinical practice radiographers ($n = 2108$) as reported by Akroyd, Caison, and Adams (2002). The result of the EE comparison was statistically significant with a 95% confidence interval $t(240) = -5.73, p < .05$. Radiologic science educators expressed less emotional exhaustion than clinical practice radiographers. The result of the Dp comparison was statistically significant with a 95% confidence interval $t(240) = -5.97, p < .05$. Radiologic science educators expressed less feelings of depersonalization than clinical practice radiographers. The result of the PA comparison was statistically significant with a 95% confidence interval $t(240) = 2.81, p < .05$. Radiologic science educators reported greater feelings of personal accomplishment than clinical practice radiographers. See Table One for a summary of score comparisons.

Table 2
Section Mean Score

Section	Radiologic Science Educators	National Norms	Clinical Practice Radiographers
EE	19.23	20.99	23.7
Dp	5.29	8.73	7.2
PA	38.15	34.58	36.8

A multiple regression analysis was conducted to identify any relationships between the burnout level as determined by the MBI and the self reported health status. Questions for the MBI and self reported health status were based on a 0 to 6 Likart scale where 0 = never and 6 = every day. There were a total of nine self reported health status questions and the mean response score was 13.5 out of 54 possible. Frequency and percentage for each self reported health status questions (symptoms) are reported in appendix F. The MBI EE subscale had a total of nine questions and the mean response score was 19.2 out of 54 possible. The MBI Dp subscale had a total of five questions and the mean response score was 5.2 out of 30 possible. The last MBI subscale PA had a total of eight questions and the mean response score was 38.1 out of 48 possible. Frequency and percentage for each MBI question are reported in appendix G.

The results of the health status and EE subscale were statistically significant, $R^2 = .27$ and the adjusted $R^2 = .27$, $F(1, 239) = 87.89$, $p < .01$. The multiple correlation

coefficient was .52, indicating that approximately 27% of the variance in health status is explained by emotional exhaustion. The results of the health status and Dp subscale were statistically significant, $R^2 = .21$ and the adjusted $R^2 = .21$, $F(1, 239) = 62.85$, $p < .01$. The multiple correlation coefficient was .46, indicating that approximately 21% of the variance in health status is explained by depersonalization. The results of the health status and PA subscale were also statistically significant $R^2 = .06$ and the adjusted $R^2 = .06$, $F(1, 239) = 15.10$, $p < .01$. The multiple correlation coefficient was -.24, indicating that approximately 6% of the variance in health status is explained by personal accomplishment.

The EE subscale is the primary indicator of stress level. As previously mentioned radiologic science educators scored average in stress level compared to the national norm. When health status was compared to this subscale, 10% of variance in anxiety alone is explained by EE.

Finally, one-way ANOVAs were conducted to analyze the effects of age, gender, education level, and the number of years worked on each of the three subscales of the MBI. There were no statistically significant effects of these demographic factors on the EE subscale $F(11, 229) = 0.739$, $p = .80$. There were no statistically significant effects of these demographic factors on the Dp subscale $F(11, 229) = 0.63$, $p = .90$. Finally, there were no statistically significant effects of these demographic factors on the PA subscale $F(11, 229) = 0.72$, $p = .82$.

Summary

In this study, a 62% response rate was obtained from a convenience sample of radiologic science educators. The respondents were 72% female which anecdotally reflects the gender demographics of the radiologic science profession. The MBI was administered along with a health status questionnaire and demographics section. The results of the MBI indicate that radiologic science educators experience less emotional exhaustion, less depersonalization, and greater personal accomplishment than a similar national group used as a norm. This study group also yielded the same results when compared to a national group of clinical practice radiographers. Overall radiologic science educators were average in their feelings of emotional exhaustion, low in their feelings of depersonalization, and average in their feelings of personal accomplishment based on MBI subscale score ranges.

A statistically significant result was found between all three subscales of the MBI and the participant reported health status. No significant demographic interactions with MBI subscales were identified.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

This chapter will provide an overview of the study. It will include a brief description of the study design, disposition of the hypotheses, and discuss the importance of findings. It will conclude with recommendations for future research.

Summary

This was a survey study using a convenience sample. The sample consisted of 241 Radiologic science educator members of a national association. The participants were 72% female and the average age was 48 years. The purpose of this study was to examine the perceived level of occupational stress and burnout of radiologic science educators. The study focused on the level of burnout, as measured by “emotional exhaustion” (fatigue or stress), “depersonalization” (feelings of callousness or indifference in regard to students), “personal accomplishment” (feelings of enthusiasm and effectiveness in working with people), and stress related health problems (Maslach & Jackson, 1981).

An electronic version of the Maslach Burnout Inventory with health status and demographic questions was emailed to members of the Association of Educators in Radiologic Science through Surveymonkey.com. Data were downloaded from Surveymonkey.com and entered into SPSS for Windows for analysis. Results indicated radiologic science educators were average in their feelings of emotional exhaustion, low in their feelings of depersonalization, and average in their feelings of personal

accomplishment. The results indicated that radiologic science educators experienced less burnout when compared both to a national norm group and to a national group of clinical practice radiographers. Also, a statistically significant result was found between all three subscales of the MBI and the reported health status.

Conclusion

The research question, “does stress have a negative impact on the health and longevity of radiologic faculty?”, has mixed answers. A positive correlation was found between health status and those who scored higher on levels of burnout. Because the average age of radiologic science faculty was 48 and they reported lower burnout levels compared to clinical practice radiographers and the national norms, it appears that longevity may not be affected by burnout and health status.

The following hypotheses were tested in this study. The chart (table 3) below lists each hypothesis with the action taken.

Table 3

Disposition of Hypotheses

Hypothesis	Action
1. There will be no statistically significant effects of age, gender, education level, or number of years worked on stress scores as measured by the Maslach Burnout Inventory.	Not rejected

- | | | |
|----|--|----------|
| 2. | Emotional exhaustion as measured by the Maslach Burnout Inventory will not predict adverse health effects as measured by the self reported health status questionnaire. | Rejected |
| 3. | Depersonalization as measured by the Maslach Burnout Inventory will not predict adverse health effects as measured by the self reported health status questionnaire. | Rejected |
| 4. | Lack of personal accomplishment as measured by the Maslach Burnout Inventory will not predict adverse health effects as measured by the self reported health status questionnaire. | Rejected |
| 5. | There will be no statistically significant difference between radiologic science educator scores and Maslach Burnout Inventory national norms. | Rejected |
| 6. | There will be no statistically significant difference between radiologic science educator scores and clinical practice radiographer scores as measured by the Maslach Burnout Inventory. | Rejected |

Discussion and Implications

This study appears to be the first in investigating burnout specifically among radiologic science educators. The results establish a baseline for future studies. There are many important reasons for continuing research in this direction. As previously mentioned, there is a profound effect burnout has on the health of the educator (Hunter & Houghton, 1993; Michailidis & Asimenos, 2002; Stein, 2001; Strazdins, D'Souza, Lim, Broom, & Rodgers, 2004; Williams, 2003). Burnout also may have an impact on the quality of education that the student receives (Schwab, Jackson, & Schuler, 1986; Stern & Cox, 1993; Taris, Van Horn, Schaufeli, & Schreurs, 2004; Wisniewski & Gargiulo, 1997). Finally, burnout creates a financial burden on the profession and society in terms of cost of treatment, missed work, low productivity, and lower job performance (Hunter & Houghton, 1993; Morall, 1994; Pelletier & Lutz, 1988; Penny, 2005; Sechrist & Frazer, 1992; Stein, 2001; Williams, 2003).

The results of this study indicate that radiologic science educators experience less burnout compared to the national comparison group. Pisanti, Gagliardi, Razzino, and Bertini (2003) conducted a study of educators which indicated that when teachers had greater job control they experienced less burnout. Griva and Joeckes (2003) studied teachers with little job control, among other factors, and found these contributed to higher levels of burnout. These studies may explain the results, in part, here because radiologic science education programs are generally small and the faculty members have a great

deal of autonomy in their daily work. Typically, most programs consist of only two or three faculty members.

This study also found a significant correlation between the health status and reported burnout level. To address and improve the health of these individuals, one must first isolate the contributing factors (stressors) and then design a program to help the individual deal with these factors effectively. Data collected for this study can be used later to better correlate specific health problems to specific stressors for the purpose of designing effective health promotion/disease prevention strategies.

Through the literature review the education profession was found to be a stressful occupation (Schwab et al., 1986; Vance, Miller, Humphreys, & Reynolds, 1989). While radiologic science educators in this study exhibited less burnout than the national norms, this could change dramatically in the upcoming years. There are currently 591 accredited radiography programs in the United States (Joint Review Committee on Education in Radiologic Technology [JRCERT], 2005). In order to meet the anticipated demand for radiographers over the next 10 years, these programs will need to graduate 72,000 new radiographers (American Society of Radiologic Technologists [ASRT], 2004). ASRT currently projects these programs will fall short by about 10,000 radiographers. In this same study, ASRT also reported that 66% of radiographic programs have difficulty recruiting new faculty. To compound this problem, by 2009 the Joint Review Committee on Education in Radiologic Technology will require that program directors hold a masters degree. Presently, only 51% of program directors have master's degrees

(JRCERT, 2005). These factors may combine to create significant new stressors on radiologic science faculty changing burnout levels and negatively affecting the health of these educators. Three statistically significant results were identified. A positive correlation was found between health status and the three subscales of the MBI. Approximately 27% of the variance in health status is explained by emotional exhaustion. Approximately 21% of the variance in health status is explained by depersonalization and approximately 6% of the variance in health status is explained by personal accomplishment.

Recommendations

This study identified a significant correlation between health status and reported level of burnout. More research should be conducted to identify specific stressors in order to develop health promotion/disease prevention programs to address this underserved population. Further research should also be conducted to follow up on why radiologic science educators experienced less stress than clinical practice radiographers reported in the Akroyd, Caison, and Adams (2002) study and perhaps develop intervention programs to address the differences. Understanding why radiologic science educators experience less stress may help both areas of radiologic science practice. This knowledge may also be something to incorporate into the radiologic science education curriculum.

It is also recommended that research be conducted on the quality of education received by students of educators experiencing high levels of burnout versus students of

educators experiencing low levels of burnout. It was suggested that burnout can affect a teacher's performance in the classroom (Schwab et al., 1986; Wisniewski & Gargiulo, 1997; Taris et al., 2004; Stern & Cox, 1993). It may be worthwhile to identify such problems and, if attributable to stress and burnout, treat the educator for the benefit of all concerned.

Finally, this study appears to be the first of its kind that addresses burnout of radiologic science educators. Because of this, the study should be repeated in other settings using other samples for the purpose of supporting or disputing the results reported. With more studies of radiologic science educators, a better understanding of the effects of burnout will develop. From this understanding programs can be developed to address the health of radiologic science educators and other similar groups.

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APPENDICES

APPENDIX A
AERS BOARD PERMISSION LETTER



PO Box 90204
Albuquerque, New Mexico 87199-0204
Telephone/Fax (505) 823-4740

aers@ell.net

www.aers.org

Association of Educators in Radiological Sciences, Inc.

March 6, 2006

To Whom It May Concern:

I am writing to inform you that Jeff Killion (Texas Women's University PhD. Health Studies graduate student) received board approval from The Association of Educators in Radiological Sciences (AERS) to survey our membership for his dissertation.

If you need further information please contact me.

Sincerely,

A handwritten signature in cursive script that reads 'Carole South-Winter'. The signature is written in black ink and is positioned above the typed name.

Carole South-Winter, ME.d., RT (R), CNMT
AERS President

APPENDIX B
INTRODUCTORY STATEMENT

OCCUPATIONAL STRESS AND BURNOUT AMONG RADIOLOGIC SCIENCE EDUCATORS

Dear Radiologic science educator:

You are asked to participate in a research study conducted by Jeff Killion a doctoral candidate from the department of Health Studies at Texas Women's University. The results of the survey will be used as part of a dissertation.

The purpose of this study is to establish a baseline level of stress and burnout experienced by radiologic science educators and its effect on their health. Your participation in this study is entirely voluntary. By responding to this survey you are agreeing to participate.

If you choose to participate in this study you will be asked to complete a 39 question information survey. The survey will take 10-15 minutes to complete. The survey consists of demographic, Maslach Burnout Inventory, and health status questions. To access the survey you will use the web link provided, it will take you to SurveyMonkey.com where an electronic version of the survey will be administered. Please take the survey within two weeks of receiving this request. Only the author of this study will view the data received; no risks are identified in completion of this study.

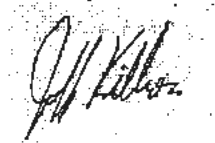
This study will examine the perception of occupation stress and burnout experienced by radiologic science educators. Based on the results of this study, future work to determine the causes and potential interventions to reduce the effects of stress and burnout on this population could be conducted. This study will also provide a starting point for health education efforts in this un-served population.

Information collected from this study will remain confidential and will be protected to the extent allowed by law. Findings of the study will be kept for a total of five years in a secure location and then destroyed. A feature of SurveyMonkey.com is that the participants and their institutions will remain anonymous. Only the author of the study will review the data collected.

Your participation is voluntary. You may withdraw your consent to participate at any time without penalty or loss of benefit to which participants are otherwise entitled.

If you have any questions, concerns, or would like a copy of the results please contact Jeff Killion at 940-397-4679 or jeff.killion@mwsu.edu. If you have a question about your rights as a participant in this research or the way this study has been conducted, you may contact the Texas Woman's University Office of Research and Sponsored Programs at 940-898-3378.

Thank you,



Jeff Killion

APPENDIX C

MIDWESTERN STATE UNIVERSITY APPROVAL LETTER



Human Subjects In Research Committee

Institutional Review Board in
Compliance with 45 CFR 46

MSU Policy 2.37

MEMORANDUM

TO: Jeffery B. Killion

RE: HSRC Application

DATE: December 7, 2005

Please be advised that your application for research utilizing human subjects has been reviewed and approved by the above named committee. The number assigned this project is:

File number: 05120701

Please include this number in any presentation or publication arising from this research. You may be required to place a copy of this letter within the thesis or other class, department, or college documentation. This approval is valid for one calendar year following granting of approval status. You may request an extension by submitting a letter requesting such to the HSRC committee chair.

Respectfully,

Chair, Human Subjects in Research Committee

APPENDIX D

TEXAS WOMAN'S UNIVERSITY APPROVAL LETTER



Institutional Review Board
Office of Research and Sponsored Programs
P.O. Box 425619, Denton, TX 76204-5619
940-898-3378 Fax 940-898-3416
e-mail: IRB@twu.edu

January 9, 2006

Mr. Jeffrey B. Killion
12 Basswood Dr.
Wichita Falls, TX 76310

Dear Mr. Killion:

Re: Occupational Stress and Burnout Among Radiologic Science Educators

The above referenced study has been received and reviewed by the Texas Woman's University Institutional Review Board (IRB) and has been determined to be exempt from further review because it has been reviewed and approved by an IRB at Midwestern State University in Wichita Falls, Texas.

Another review by the TWU IRB is required if your project changes in any way, and the TWU IRB must be notified immediately regarding any adverse events. If you have any questions, feel free to call the TWU Institutional Review Board at the phone number listed above.

Sincerely,

Handwritten signature of David J. Nichols

Dr. David Nichols, Chair
Institutional Review Board - Denton

cc. Dr. Susan Ward, Department of Health Studies

Simply the BEST

APPENDIX E
SURVEY INSTRUMENT

Occupational Stress and Burnout among Radiologic science educators Survey

Demographic Questions

Please select the one most appropriate answer

1. Do you teach?

_____ Full time

_____ Part time

2. What is your education level?

_____ Hospital Certificate

_____ Associate Degree

_____ Bachelors Degree

_____ Masters Degree

_____ Doctoral Degree

3. How many years have you been employed as an educator of Radiologic Sciences?

_____ years

4. What is the setting of your program?

_____ Hospital

_____ Community college

_____ University

_____ Proprietary

5. What is your gender?

_____ Female

_____ Male

6. Your age is

_____ years

Maslach Burnout Inventory – Educator

Please read each statement carefully and decide if you ever feel this way about your job. If you have *never* had this feeling, write a “0” (zero) in the space before the statement. If you have had this feeling, indicate how often you feel it by writing the number (from 1 to 6) that best describes how frequently you feel that way.

HOW OFTEN	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every Day

- 7. _____ I feel emotionally drained from my work
- 8. _____ I feel used up at the end of the workday
- 9. _____ I feel fatigued when I get up in the morning and have to face another day on the job
- 10. _____ I can easily understand how my students feel about things
- 11. _____ I feel I treat some students as if they were impersonal objects
- 12. _____ Working with people all day is really a strain for me
- 13. _____ I deal very effectively with the problems of my students
- 14. _____ I feel burned out from my work
- 15. _____ I feel I’m positively influencing other people’s lives through my work

16. _____ I've become more callous toward people since I took this job
17. _____ I worry that this job is hardening me emotionally
18. _____ I feel very energetic
19. _____ I feel frustrated by my job
20. _____ I feel I'm working too hard on my job
21. _____ I don't really care what happens to some students
22. _____ Working with people directly puts too much stress on me
23. _____ I can easily create a relaxed atmosphere with my students
24. _____ I feel exhilarated after working closely with my students
25. _____ I have accomplished many worthwhile things in this job
26. _____ I feel like I am at the end of my rope
27. _____ In my work, I deal with emotional problems very calmly
28. _____ I feel students blame me for some of their problems

Health Status

Please read each statement carefully and decide if you ever feel this way about your job. If you have *never* had this feeling, write a "0" (zero) in the space before the statement. If you have had this feeling, indicate how often you feel it by writing the number (from 1 to 6) that best describes how frequently you feel that way.

HOW OFTEN	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every Day

29. _____ I suffer from increased blood pressure
30. _____ I have felt my heart race or pound

31. _____ I have experienced rapid shallow breathing
32. _____ I suffer from heartburn
33. _____ I suffer from stomach cramps
34. _____ I suffer from anxiety
35. _____ I have experienced difficulty sleeping
36. _____ I suffer from headaches
37. _____ I have experienced gastrointestinal disturbances

Please check all that apply

38. Do you take medication for any of the following:

- _____ increased blood pressure
- _____ heart palpitations (race or pound)
- _____ rapid shallow breathing
- _____ heartburn
- _____ stomach cramps
- _____ anxiety
- _____ difficulty sleeping
- _____ headaches
- _____ gastrointestinal disturbances

39. Do you have a family history for any of the following:

- _____ increased blood pressure
- _____ heart palpitations (race or pound)
- _____ rapid shallow breathing
- _____ heartburn
- _____ stomach cramps
- _____ anxiety
- _____ difficulty sleeping
- _____ headaches
- _____ gastrointestinal disturbances

Thank you for completing this survey

APPENDIX F
HEALTH STATUS QUESTIONNAIRE RELIABILITY

Results from test-retest of health status questions

<u>Questions</u>	<u>Test</u>	<u>Retest</u>
1	0.89	1.00
2	2.11	2.22
3	0.56	0.33
4	3.11	3.22
5	1.00	0.78
6	2.00	1.56
7	1.89	1.44
8	2.89	2.78
9	2.56	1.89
	0.953887	Person

APPENDIX G
SURVEY RAW DATA

MBI Question #1
I feel emotionally drained from my work

	Frequency	Percent
Never	6	2.5
A few times a year or less	70	29.0
Once a month or less	30	12.4
A few times a month	57	23.7
Once a week	23	9.5
A few times a week	45	18.7
Every day	10	4.1
Total	241	100.0

MBI Question #2
I feel used up at the end of the workday

	Frequency	Percent
Never	10	4.1
A few times a year or less	58	24.1
Once a month or less	35	14.5
A few times a month	42	17.4
Once a week	24	10.0
A few times a week	58	24.1
Every day	14	5.8
Total	241	100.0

MBI Question #3

I feel fatigued when I get up in the morning and have to face another day on the job

	Frequency	Percent
Never	43	17.8
A few times a year or less	72	29.9
Once a month or less	35	14.5
A few times a month	38	15.8
Once a week	13	5.4
A few times a week	33	13.7
Every day	7	2.9
Total	241	100.0

MBI Question #4

I can easily understand how my students feel about things

	Frequency	Percent
Never	0	0.0
A few times a year or less	7	2.9
Once a month or less	9	3.7
A few times a month	25	10.4
Once a week	37	15.4
A few times a week	72	29.9
Every day	91	37.8
Total	241	100.0

MBI Question #5
I feel I treat some students as if they were impersonal objects

	Frequency	Percent
Never	147	61.0
A few times a year or less	66	27.4
Once a month or less	11	4.6
A few times a month	11	4.6
Once a week	2	0.8
A few times a week	3	1.2
Every day	1	0.4
Total	241	100.0

MBI Question #6
Working with people all day is really a strain for me

	Frequency	Percent
Never	73	30.3
A few times a year or less	80	33.2
Once a month or less	31	12.9
A few times a month	38	15.8
Once a week	6	2.5
A few times a week	10	4.1
Every day	3	1.2
Total	241	100.00

MBI Question #7
I deal very effectively with the problems of my students

	Frequency	Percent
Never	1	0.4
A few times a year or less	2	0.8
Once a month or less	6	2.5
A few times a month	20	8.3
Once a week	32	13.3
A few times a week	79	32.8
Every day	101	41.9
Total	241	100.0

MBI Question #8
I feel burned out from my work

	Frequency	Percent
Never	40	16.6
A few times a year or less	91	37.8
Once a month or less	32	13.3
A few times a month	32	13.3
Once a week	17	7.1
A few times a week	23	9.5
Every day	6	2.5
Total	241	100.0

MBI Question #9
I feel I'm positively influencing other people's lives through my work

	Frequency	Percent
Never	0	0.0
A few times a year or less	9	3.7
Once a month or less	12	5.0
A few times a month	24	10.0
Once a week	17	7.1
A few times a week	60	24.9
Every day	119	49.4
Total	241	100.0

MBI Question #10
I've become more callous toward people since I took this job

	Frequency	Percent
Never	99	41.1
A few times a year or less	81	33.6
Once a month or less	25	10.4
A few times a month	15	6.2
Once a week	8	3.3
A few times a week	11	4.6
Every day	2	0.8
Total	241	100.0

MBI Question #11
I worry that this job is hardening me emotionally

	Frequency	Percent
Never	125	51.9
A few times a year or less	75	31.1
Once a month or less	16	6.6
A few times a month	6	2.5
Once a week	4	1.7
A few times a week	10	4.1
Every day	5	2.1
Total	241	100.0

MBI Question #12
I feel very energetic

	Frequency	Percent
Never	2	0.8
A few times a year or less	6	2.5
Once a month or less	15	6.2
A few times a month	49	20.3
Once a week	20	8.3
A few times a week	94	39.0
Every day	55	22.8
Total	241	100.0

MBI Question #13
I feel frustrated by my job

	Frequency	Percent
Never	12	5.0
A few times a year or less	79	32.8
Once a month or less	37	15.4
A few times a month	52	21.6
Once a week	20	8.3
A few times a week	29	12.0
Every day	12	5.0
Total	241	100.0

MBI Question #14
I feel I'm working too hard on my job

	Frequency	Percent
Never	18	7.5
A few times a year or less	54	22.4
Once a month or less	30	12.4
A few times a month	43	17.8
Once a week	27	11.2
A few times a week	35	14.5
Every day	34	14.1
Total	241	100.0

MBI Question #15
I don't really care what happens to some students

	Frequency	Percent
Never	159	66.0
A few times a year or less	63	26.1
Once a month or less	8	3.3
A few times a month	7	2.9
Once a week	1	0.4
A few times a week	2	0.8
Every day	1	0.4
Total	241	100.0

MBI Question #16
Working with people directly puts too much stress on me

	Frequency	Percent
Never	88	36.5
A few times a year or less	97	40.2
Once a month or less	25	10.4
A few times a month	17	7.1
Once a week	6	2.5
A few times a week	7	2.9
Every day	1	0.4
Total	241	100.0

MBI Question #17
I can easily create a relaxed atmosphere with my students

	Frequency	Percent
Never	0	0.0
A few times a year or less	2	0.8
Once a month or less	6	2.5
A few times a month	15	6.2
Once a week	23	9.5
A few times a week	78	32.4
Every day	117	48.5
Total	241	100.0

MBI Question #18
I feel exhilarated after working closely with my students

	Frequency	Percent
Never	2	0.8
A few times a year or less	6	2.5
Once a month or less	6	2.5
A few times a month	28	11.6
Once a week	29	12.0
A few times a week	93	38.6
Every day	77	32.0
Total	241	100.0

MBI Question #19
I have accomplished many worthwhile things in this job

	Frequency	Percent
Never	0	0.0
A few times a year or less	8	3.3
Once a month or less	12	5.0
A few times a month	30	12.4
Once a week	28	11.6
A few times a week	94	39.0
Every day	69	28.6
Total	241	100.0

MBI Question #20
I feel like I am at the end of my rope

	Frequency	Percent
Never	79	32.8
A few times a year or less	106	44.0
Once a month or less	18	7.5
A few times a month	12	5.0
Once a week	9	3.7
A few times a week	15	6.2
Every day	2	0.8
Total	241	100.0

MBI Question #21
In my work, I deal with emotional problems very calmly

	Frequency	Percent
Never	0	0.0
A few times a year or less	12	5.0
Once a month or less	21	8.7
A few times a month	30	12.4
Once a week	32	13.3
A few times a week	67	27.8
Every day	79	32.8
Total	241	100.0

MBI Question #22
I feel students blame me for some of their problems

	Frequency	Percent
Never	33	13.7
A few times a year or less	83	34.4
Once a month or less	43	17.8
A few times a month	32	13.3
Once a week	20	8.3
A few times a week	17	7.1
Every day	13	5.4
Total	241	100.0

Health Status Question #1
I suffer from increased blood pressure

	Frequency	Percent
Never	145	60.2
A few times a year or less	30	12.4
Once a month or less	5	2.1
A few times a month	14	5.8
Once a week	8	3.3
A few times a week	5	2.1
Every day	34	14.1
Total	241	100.0

Health Status Question #2
I have felt my heart race of pound

	Frequency	Percent
Never	61	25.3
A few times a year or less	111	46.1
Once a month or less	27	11.2
A few times a month	23	9.5
Once a week	7	2.9
A few times a week	9	3.7
Every day	3	1.2
Total	241	100.0

Health Status Question #3
I have experienced rapid shallow breathing

	Frequency	Percent
Never	162	67.2
A few times a year or less	44	18.3
Once a month or less	14	5.8
A few times a month	11	4.6
Once a week	3	1.2
A few times a week	4	1.7
Every day	3	1.2
Total	241	100.0

Health Status Question #4
I suffer from heartburn

	Frequency	Percent
Never	82	34.0
A few times a year or less	58	24.1
Once a month or less	25	10.4
A few times a month	32	13.3
Once a week	10	4.1
A few times a week	18	7.5
Every day	16	6.6
Total	241	100.0

Health Status Question #5
I suffer from stomach craps

	Frequency	Percent
Never	135	56.0
A few times a year or less	50	20.7
Once a month or less	15	6.2
A few times a month	16	6.6
Once a week	7	2.9
A few times a week	14	5.8
Every day	4	1.7
Total	241	100.0

Health Status Question #6
I suffer from anxiety

	Frequency	Percent
Never	62	25.7
A few times a year or less	98	40.7
Once a month or less	26	10.8
A few times a month	25	10.4
Once a week	11	4.6
A few times a week	12	5.0
Every day	7	2.9
Total	241	100.0

Health Status Question #7
I have experienced difficulty sleeping

	Frequency	Percent
Never	34	14.1
A few times a year or less	73	30.3
Once a month or less	30	12.4
A few times a month	33	13.7
Once a week	24	10.0
A few times a week	38	15.8
Every day	9	3.7
Total	241	100.0

Health Status Question #8
I suffer from headaches

	Frequency	Percent
Never	50	20.7
A few times a year or less	88	36.5
Once a month or less	36	14.9
A few times a month	30	12.4
Once a week	18	7.5
A few times a week	16	6.6
Every day	3	1.2
Total	241	100.0

Health Status Question #9
I have experienced gastrointestinal disturbances

	Frequency	Percent
Never	73	30.3
A few times a year or less	77	32.0
Once a month or less	30	12.4
A few times a month	23	9.5
Once a week	8	3.3
A few times a week	19	7.9
Every day	11	4.6
Total	241	100.0

Health Status Question #10
Do you take medication for high blood pressure

	Frequency	Percent
Yes	48	19.9
No	193	80.1
Total	241	100.0

Health Status Question #11
Do you take medication for heart palpitations

	Frequency	Percent
Yes	7	2.9
No	234	97.1
Total	241	100.0

Health Status Question #12
Do you take medication for rapid shallow breathing

	Frequency	Percent
Yes	0	0.0
No	241	100.0
Total	241	100.0

Health Status Question #13
Do you take medication for heartburn

	Frequency	Percent
Yes	63	26.1
No	178	73.9
Total	241	100.0

Health Status Question #14
Do you take medication for stomach cramps

	Frequency	Percent
Yes	7	2.9
No	234	97.1
Total	241	100.0

Health Status Question #15
Do you take medication for anxiety

	Frequency	Percent
Yes	25	10.4
No	216	89.6
Total	241	100.0

Health Status Question #16
Do you take medication for difficulty sleeping

	Frequency	Percent
Yes	33	13.7
No	208	86.3
Total	241	100.0

Health Status Question #17
Do you take medication for headaches

	Frequency	Percent
Yes	65	27.0
No	176	73.0
Total	241	100.0

Health Status Question #18
Do you take medication for gastrointestinal disturbances

	Frequency	Percent
Yes	32	13.3
No	209	86.7
Total	241	100.0

Health Status Question #19
Do you have a family history of increased blood pressure

	Frequency	Percent
Yes	131	54.4
No	110	45.6
Total	241	100.0

Health Status Question #20
Do you have a family history of heart palpitations

	Frequency	Percent
Yes	33	13.7
No	208	86.3
Total	241	100.0

Health Status Question #21
Do you have a family history of rapid shallow breathing

	Frequency	Percent
Yes	4	1.7
No	237	98.3
Total	241	100.0

Health Status Question #22
Do you have a family history of heartburn

	Frequency	Percent
Yes	47	19.5
No	194	80.5
Total	241	100.0

Health Status Question #23
Do you have a family history of stomach cramps

	Frequency	Percent
Yes	8	3.3
No	233	96.7
Total	241	100.0

Health Status Question #24
Do you have a family history of anxiety

	Frequency	Percent
Yes	33	13.7
No	208	86.3
Total	241	100.0

Health Status Question #25
Do you have a family history of difficulty sleeping

	Frequency	Percent
Yes	29	12.0
No	212	88.0
Total	241	100.0

Health Status Question #26
Do you have a family history of headaches

	Frequency	Percent
Yes	39	16.2
No	202	83.8
Total	241	100.0

Health Status Question #27
Do you have a family history of gastrointestinal disturbances

	Frequency	Percent
Yes	39	16.2
No	202	83.8
Total	241	100.0
