FR-1704

Final report

RG/2006/HS/08

FR - 1704.

Table of contents

Section 1

Information regarding project/ project personnel:

1. Contact Number
   0112530890, 071 4809450

2. Title of the Project
   Prevalence and correlates of occupational stress and the effectiveness of an intervention to manage occupational stress among selected categories of employees in domestic commercial banks in the district of Colombo

3. Principal Investigator
   Prof. Rohinie de Alwis Seneviratne

4. Co-Investigators
   Dr. S. A. I. K. Suraweera, Dr. H.M.S.S.D. Herath

5. Institute where research was carried out
   Faculty of Medicine, University of Colombo

6. Date of award
   18/12/2006

7. Date of completion of the project
   August 2008

8. Total allocation of funds
   Rs. 367 000/=

9. Total spent (Rs)
   Rs. 355 512.50

10. Number of research students employed
    None

11. Post graduate degree completed with dates
    MD (Community Medicine) - February 2009

12. Number of Technical Assistants employed
    8

13. Publications/communications arising from the project during the reporting period

- Suraweera SAIK, Seneviratne R de A, Herath HMSSD: Prevalence and correlates of occupational stress in middle level managers of domestic commercial banks in a district of Sri-Lanka *Abstract: (Presented) 14th Annual Academic Sessions, Sri Lanka College of Community Physicians, September 2009.*

- Suraweera SAIK, Seneviratne R de A, Herath HMSSD: Reliability and validity of the Sinhalese version of the Job Content Questionnaire (JCQ) - A study in banking

employees in domestic commercial banks in a district of Sri- *Abstract: (Presented) 41st^h Annual Sessions, The Asia-Pacific Academic Consortium for Public Health (APACPH) 41st^h Annual Sessions, Thaipei, December 2009.*

- Suraweera SAIK, Seneviratne R de A, Herath HMSSD: Correlates of occupational stress among operational staff employees in domestic commercial banks in a district of Sri Lanka- *Abstract: (Presented) 41st^h Annual Sessions, The Asia-Pacific Academic Consortium for Public Health (APACPH) 41st^h Annual Sessions, Thaipei, December 2009.*

- Suraweera SAIK, Seneviratne R de A, Herath HMSSD: Prevalence of occupational stress in selected categories of employees in domestic commercial banks in a district of Sri-Lanka. *Abstract: (Presented) 41st^h Annual Sessions, The Asia-Pacific Academic Consortium for Public Health (APACPH), Thaipei, December 2009.*

- Suraweera SAIK, Seneviratne R de A, Herath HMSSD: Correlates of occupational stress among middle level managers in domestic commercial banks in a district of Sri-Lanka *Abstract: (Presented) 41st^h Annual Sessions, The Asia-Pacific Academic Consortium for Public Health (APACPH), Thaipei, December 2009.*

- Suraweera SAIK, Seneviratne R de A, Herath HMSSD: A study of the prevalence and correlates of occupational stress in middle level managers of domestic commercial banks in a district of Sri Lanka *Abstract: (Presented) Workability 2009, International conference on psychosocial factors at work Bangkok, Thailand, December 2009.*

- Suraweera SAIK, Seneviratne R de A, Herath HMSSD: Prevalence and correlates of occupational stress among operational staff in domestic commercial banks in a district of Sri-Lanka *Abstract: (Presented) Workability 2009, International conference on psychosocial factors at work Bangkok, Thailand, December 2009.*

Section 2

Executive summary of the project

Occupational stress can no longer be considered occasional. It is increasingly becoming a very important phenomenon, affecting all categories of workers in every country and warrants urgent attention.

The present study was carried out to assess the prevalence and correlates of occupational stress in middle level managers and operational staff members in domestic commercial banks in the Colombo district. It also intended to assess the effectiveness of an occupational stress management intervention conducted for middle level managers.

The study consisted of three components. Component one of the study validated three selected scales of an instrument, the Job Content Questionnaire before its application in the main study to assess the prevalence of iso-strain and high job strain, which measure occupational stress. Component two was a cross-sectional study done to assess the prevalence and correlates of occupational stress in middle level managers and operational staff members in domestic commercial banks in the Colombo district. Component three was a cluster randomized controlled study carried out to assess the effectiveness of an occupational stress management intervention for middle level managers.

The validated decision latitude, psychological demands and social support at work scales of the JCQ consisting of 22 items were found to be a valid and reliable instrument to assess occupational stress in banking workers. The Cronbach's alpha for decision latitude, psychological demands and social support were 0.71, 0.61 and 0.8 respectively for the total group.

The study revealed that high job strain and iso-strain are occupational health problems of bank workers. The prevalence of iso-strain and high job strain among middle level managers was found to be 10.2% (95% CI 8.1-12.3) and 17.8% (95% CI 15.1-20.5) respectively.

The prevalence of iso-strain and high job strain among operational staff members was found to be 14.5% (95% CI 12.1-16.9) and 24.4% (95% CI 21.5-27.3) respectively. Operational staff members perceived more iso-strain as well as high job strain than the middle level managers according to the present study and the difference was found to be statistically significant at ($p=0.049$) and ($p=0.01$) respectively.

Iso-strain among male middle level managers was 10.5% (95% CI 8.3-12.7) compared with 9.7% (95% CI 7.6–11.6) among females, while high job strain among male and female middle level managers were 18.3% (95% CI 15.6–21.0) and 17.2% (95% CI 14.5–19.9) respectively. These differences were not significant ($p>0.05$).

The prevalence of iso-strain among male and female operational staff members was 15.4 % (95% CI 13.0–17.8) and 13.6% (95% CI 11.3–15.9) respectively, while a slightly higher level of high job strain among both male 26.7% (95% CI 23.7–29.7) and female operational staff members 22.4% (95% CI 19.6–25.2) was observed. The difference among males and females for iso-strain was not statistically significant

($p>0.05$) but the difference in high job strain among male and female operational staff members was found to be significant ($p=0.04$).

It was found that taking office work home (OR 3.1; 95% CI 1.3-6.9) and job dissatisfaction (OR 7.8; 95% CI 3.6-16.8) were significant correlates of iso-strain among middle level managers with a significance of ($p=0.009$) and ($p<0.001$) respectively after adjusting for confounding. Taking office work home (OR 2.3; 95% CI 1.2-4.5) and job dissatisfaction (OR 3.3; 95% CI 1.8-5.9) were identified as significant correlates of high job strain among middle level managers as well, with a significance of ($p=0.01$) and ($p<0.001$) after adjusting for confounding. However reduction of the time spent with the family was found to be significantly correlated ($p=0.02$) only with high job strain after adjusting for confounding (OR 5.6; 95% CI 1.3-23.9) in the present study.

Among operational staff members the factors identified as significant correlates of iso-strain after controlling for confounding in the logistic regression model at 0.05 significance level were: perceived anger due to work related problems at home (Adjusted OR 1.8; 95% CI 1.1–2.9), perceived job insecurity (Adjusted OR 2.7; 95% CI 1.7–4.4), perceived lack of opportunity for promotions (Adjusted OR 3.5; 95% CI 1.9–6.2), perceived job dissatisfaction (Adjusted OR 1.9; 95% CI 1.1–3.3), perceived inability of coping work stress (Adjusted OR 3.0; 95% CI 1.8–4.9) and service of ten years or less in the currently working bank (Adjusted OR 2.5; 95% CI 1.5-4.2). Among operational staff members, the factors identified as significant correlates of high job strain after controlling for confounding in the logistic regression model at 0.05 significance level were: perceived anger due to work related problems at home (Adjusted OR 1.8; 95% CI 1.2–2.7), perceived job insecurity (Adjusted OR 2.0; 95% CI 1.3-3.1), perceived lack of opportunity for promotions (Adjusted OR 1.9; 95% CI 1.2–2.9), perceived job dissatisfaction (Adjusted OR 1.6; 95% CI 1.03–2.5), perceived inability of coping work stress (Adjusted OR 2.0; 95% CI 1.4–3.0), perceived delays in data processing (Adjusted OR 1.5; 95% CI 1.002 – 2.1), age less than 35 years (Adjusted OR 1.9; 95% CI 1.2–3.3) and being unmarried, divorced or separated (Adjusted OR 1.5; 95% CI 1.003–2.3).

The occupational stress management intervention was not found to be effective ($p>0.05$) to reduce occupational stress among middle level managers. However, levels of iso-strain and psychological distress reduced more in the study group than the control group in the present study.

Section 3

Report in detail

Introduction

Stress, in general, and occupational stress, in particular, is a fact of modern day life. It is inevitable in life, and with increasing complexities, aspirations and uncertainties associated with socio-economic, political and cultural upheavals, stress is only likely to increase.

1.1 What is stress?

The modern concept of stress has evolved since being introduced by Hans Selye in 1930. He defined stress as the nonspecific response of the body to any demand made upon it. According to him, not all stress is negative or bad. For instance, in his work on the topic of stress, Selye (1976) conceptualized two categories, namely good or desirable stress (eustress) and bad or undesirable stress (distress). Eustress is pleasant, or at least challenging, and can produce positive effects such as the maximization of output and creativity. Ironically, without this positive type of stimuli, life can become stressful. In contrast, distress is evident when a person perceives himself or herself as having no ability to control a stressful event. Distress is likely to result in a loss of productivity and a decline in overall levels of well-being (Kendall *et al* 2000).

The term 'stress' "has so many different meanings that it is confusing, elusive, and heard so often. Its meaning is frequently distorted and its implications taken for granted" (Arthur 2005). Its complexity is reflected in the large number of definitions in circulation (Di Martino 1992). Shirom (1982) defined stress as an individual's perception that environmental demands (stressors) exceed his or her capabilities and resources, thus leading to negative outcomes. According to Di Martino (1992) and Cox (1993) it is an interactive psychological process or a psychological state between the individual and the situation. According to this model stress is seen as the perceived imbalance between internal and external demands facing the individual and the perceived ability to cope with the situation. Faced with an external threat, be it from the physical or the psychosocial environment, the organism will try to respond by employing coping resources and strategies developed for example from previous experience. This process will be influenced by the nature and the extent of the demands, the characteristics of the person, support available to the individual and the constraints under which the coping process is taking place (Cox *et al* 2000).

1.2 Sources of stress

It is important to appreciate that stress arises from various sources. Stress can be caused by environmental, organizational and individual variables (Metteson and Ivancevich 1999; Cook and Hunsaker 2001). Stress arising as a result of the occupation, constitutes a large proportion of the overall stress response, since over 75% of non sleeping time in adults is devoted to job activities (Kendall *et al* 2000).

1.3 What is occupational stress?

The field of occupational stress is the study of those aspects of work that either have or threaten to have bad effects. Occupational stress has been described as an incompatibility between the individual and his or her work environment (Humphrey 1998). A more specific definition was provided by NIOSH (1999), which defined work stress as being the harmful physical and emotional responses that occur when the

requirements of the job do not match the capabilities, resources, or needs of the worker. Of further interest is the conceptualization offered by Lazarus (1991) who postulated that occupational stress is a process, involving a transaction between an individual and his or her work environment. Importantly stress responses occur when the imbalance is such that the worker perceives they are not coping in situations when it is important for them to cope. Workers response to stressors may be positive or negative depending on the type of demands placed on them, the amount of control they have over the situations, the amount of support they receive and the individual response of the person. When the imbalance between the demands and resources is too great, the prolonged activation of the stress response can lead to illness (Szymanski 1999).

1.4 Sources of occupational stress

To assess the consequences of stress in the workplace, we have to understand the sources of occupational stress. Cooper (1986) has differentiated six groups of primary work-related stressors: which include: factors intrinsic to work role, organizational roles, work relationships, career development, organizational factors, and the home-work interface. These six categories are not exhaustive descriptions of all potential stressors within each category, but shall be seen as a useful description for identifying physical and psychosocial sources of occupational stress.

There are a number of factors that may be intrinsic to the job. Examples are poor working conditions such as lighting, noise, smells (van Kempen *et al* 2002), and work hours (De Raeve *et al* 2007; Sparks *et al* 1997), risk and danger, new technology (Cartwright & Cooper 1997; Korunka *et al* 1995), work overload (Warr 1994; Westman & Eden 1992), and work underload (Melamed *et al* 1995). Organizational roles which may be sources of stress include role ambiguity, role conflict and responsibility. A wide range of events can create role ambiguity (Beehr 1995).

Interpersonal relationships and lack of social support from others in the workplace can be seen as a potential source of job-related stress. There is a clear connection between negative interpersonal relations and the absence of social support from within the workplace (Narayanan *et al* 1999). Lack of support from supervisors is a major source of stress at work (Cooper *et al* 2001). Lack of opportunity for career development has been described as a source of job related stress. Examples are lack of job security and promotions, fear of redundancy, retirement, and frustration of having reached one's career ceiling.

Occupational stress attributed to organizational factors is often due to the culture and management style adopted within an organization (Cooper & Cartwright 1994). Hierarchical, bureaucratic organizational structures may lead to lack of employee participation in decision-making processes, which can create a sense of not belonging and lack of job satisfaction in the organization. Inadequate communication, especially between supervisor and employees, may result in stress (Cooper *et al* 2001).

Managing the interface between work and various roles and responsibilities outside of work is another potential source of stress (O'Driscoll 1996). Number of work hours is related to added risk of work-family conflicts, decline in mental and physical health, and decreased family functioning (Major *et al* 2002).

1.5 Effects of occupational stress

Clearly, unresolved stressful situations keep a body in a constant state of activation and increase the likelihood of 'wear and tear' to biological systems. Fatigue results as a compromise in the body's ability to defend itself; and an increased risk of illness, injury

and disease have all been found to escalate with stress (National Institute of Occupational safety and Health - NIOSH 1999). Stress is, therefore, held to be causally responsible for a vast and varied range of negative health outcomes that not only affect the individual, but also the employer and society in general. These outcomes contribute to the hidden costs of stress in the workplace that are difficult, if not impossible, to quantify.

Over the last decade occupational stress, has become an issue of great concern. Where workplace matters once focused on the safety issues of physical working conditions (such as hazardous materials, noise, cleanliness, lighting and physical work overload), concern is now concentrated on the escalation of complaints relating to psychological pressures (Ivanevich *et al* 1990; Toohey 1995; Vagg & Spielberger 1998). Occupational stress has long been associated with the onset of significant physical and mental health problems. It can be seen that employees well being can be disrupted by psychological, physiological and behavioural dimensions of the stress response.

1.5.1 Psychological effects of occupational stress

A recent study that examined the effects of occupational stress on allied health professionals, found that high levels of occupational stress were associated with depression, anxiety, sick leave and propensity to leave (Quine 1998). According to Johnson (1996), occupational stress can lead to suicides, sleeping problems, depression, anxiety and burnout. Furthermore, depression and anxiety are the most common stress-related complaints presented to general practitioners, and are reported to affect twenty percent of the working population in the United Kingdom and one in every six Americans (Quick *et al* 2001). According to the WHO in its global burden of disease study, mental illness is on a par with heart disease and cancer as a cause of disability (Murray & Lopez 1996). Therefore, the psychological dimension of occupational stress has to be taken in to account very seriously. Mental ill health will definitely have negative effects on the worker productivity. Several studies have linked stress in the workplace to such factors as increased absenteeism (Cooper & Cartwright 1994), poor work performance (Kohler & Kamp 1992), health problems and staff turnover (Cooper 1986; Farrington 1995; Guppy & Gutteridge 1991; Kalimo & Vuori 1991).

1.5.2 Physical effects of occupational stress

Several studies over the last fifteen years have provided support for the involvement of stress as a risk factor in the aetiology of illness and disease (Cooper & Cartwright 1994; Lazarus and Folkman 1984; Quick *et al* 1997). Indeed, Guyton (1981) postulated that a person who experiences long term or chronic stress may potentially experience such debilitating illnesses as hypertension, coronary heart disease, stroke, diabetes, and peptic ulcer. Moreover, Humphrey (1998) in a recent review of the medical literature, found that prolonged and unyielding nervous tension developing from psychological stress, can result in psychosomatic disorders, which can lead to serious diseases. These include cirrhosis of the liver, high blood pressure, cancer and heart disease. It can also adversely affect the reproductive functions of workers (Pelletier *et al* 1999). Job stress in general has been associated also with musculoskeletal disorders, diabetes, cancer, gastrointestinal illness, cardiovascular mortality and alcohol related illnesses (Johnson 1996).

1.5.3 Behavioural effects of occupational stress

In addition to stress ill effects, a number of studies have indeed found out that occupational stress is associated with unhealthy behaviours such as smoking, physical inactivity and unhealthy eating patterns. Some individuals might turn to substance

abuse and chemical dependency to treat their occupational related stress (Pelletier *et al* 1999). It is well known that stresses as well as the associated unhealthy behaviours are major risk factors for most of the non-communicable diseases. Included among these is increased prevalence of cardiovascular disease death, hypertension, increased ventricular mass and increased risk of atherosclerosis (Reissman *et al* 1999).

1.5.4 Organizational effects of occupational stress

The results of occupational stress are clearly detrimental to both work organizations and individuals. For work organizations, the direct consequence of stress can be seen in decreased organizational effectiveness. Further, with regard to work climate, one might be able to sense a low morale and decreased motivation among employees. In addition, stress indirectly affects the organization through the individual employee by a decrease in productivity and creativity or effectiveness, an increase in errors on the job, job dissatisfaction, forgetfulness, inability to make effective decisions and increased absenteeism (Reissman *et al* 1999).

1.6 Prevalence of occupational stress

Most countries in the world have realized the gravity of the problem and considerable amount of research has been done on this aspect. In a survey done in 1997 in the United States, it was revealed that 75 per cent of Americans described their jobs as stressful, with most reporting that the stress they experienced has increased over the preceding 10 years (McCraty 1998). Based on nationwide surveys by the government every five years, it was found that more than half of Japanese employees reported occupation related stress, and the proportion has increased from 51% in 1982 to 57% in 1992, and to 63% in 1997 (Job stress in East Asia 2000). A survey of the European Union's member states found that 28% of employees reported stress-related illness or health problems. This accounts for 41 million EU workers (European Foundation for Working and Living Conditions 1996).

The Bristol Stress and Health at Work Study (Smith 2000), which used a random community sample (n=7,069), showed that 15-20% were very or extremely stressed and 40- 45% moderately stressed. Two other British surveys (Labour Force Survey 1995) based on self-reports, both using large-scale representative population-samples found that 31% and 26.5% of respondents respectively were suffering from work-related stress. A survey by Families and Work Institute found that 26% of workers reported they are 'often' or 'very often' stressed by their work. Similarly, a study by Yale University reported that 29% of employees perceived themselves to be 'quite a bit' or 'extremely stressed at work'.

In the last ten years, several countries in East Asia including China, Korea and Taiwan have rapidly industrialized and grown economically. These countries now have a lot of concern about occupational stress and its adverse effects on worker health. In a recent study of Taiwanese managers, which not only perceived stress to a larger degree than the general workforce, they were also more stressed than comparative samples from Hong Kong, the UK and Germany (Lu *et al* 1999). In a study of Brazilian white-collar-workers, it was found that Brazilian workers had higher levels of stress and were faced with more sources of stress than a normative comparison group from the UK (Moraes *et al* 1993).

1.7 Occupations most at risk of developing occupational stress

Occupations most at risk of experiencing occupational stress included police and prison officers, medical and paramedical professionals, banking staff, and community care workers (NIOSH 1999).

Increased competition, both domestically and internationally in the banking sector, has resulted in organizations introducing cost cutting and productivity improving strategies, which have resulted in increasing demands on employees (ILO 2001). New products and ways of delivering service, such as the telephone and internet, and new entrants are competing with traditional banks (Sisson and Marginson 2000). Work involving cash handling is potentially stressful as it requires high attention and exposes employees to constant pressures related to avoiding mistakes (Lindstrom 1991). Furthermore, continuous contact with the public could be a source of occupational stress on workers (Endresen *et al* 1991). The nature of much of banking work, which involves cash handling, means extensive security measures, including systems such as closed circuit television (CCTV) which constantly monitor activity, are taken to minimize risk. Although such systems are in place as much for the protection of employees as for deterring thefts, the feeling that one is under constant surveillance can be a major strain on workers whose every action is observed and recorded (Giga and Hoel 2003).

Computer-based jobs are less demanding in terms of physical effort, but require more cognitive processing and mental attention (Mocci *et al* 2001). The introduction of new technology in the banking sector has changed the way people work (Sisson and Marginson 2000). Consequently, workers employed in the banking sector are now required to carry out a multitude of tasks and possess multiple skills. Furthermore, increasing time pressures and levels of monotonous work, and decreasing levels of individual control have resulted in more incidents of occupational stress, job dissatisfaction and musculoskeletal complaints (Toivanen *et al* 1993; Smith *et al* 1999). Due to these changes, the employees in the banking sector are experiencing a high level of stress (Dileep Kumar 2006). The implications of the above said transformations have affected the social, economical and psychological domains of the bank employees and their relations. Evidence from existing literature states that more than 60% of the bank employees have one or other problem directly or indirectly related to these drastic changes (Dileep Kumar 2006). All the factors discussed above are prospective attributes to cause occupational stress and related disorders among the banking employees (Dileep Kumar 2006).

1.7.1 Banking sector in Sri Lanka

Banking industry has been identified as one of the key areas, which is fast developing in Sri Lanka. It belongs to the financial sub sector, which is considered under the services sector of the economy of our country. The services sector maintained its relative importance in the economy and contributed most to overall economic growth. There are 22 licensed commercial banks in Sri Lanka and the activities have expanded during the last few years. These operate with a network of 1405 branches and 1695 other services outlets through out Sri Lanka. The total work force in these commercial banks can be estimated as not less than 35,000 employees (Central Bank report 2007).

1.8 Justification

Occupational stress and workplace health have become issues of great concern over the last decade. It has become one of the most serious health issues in the modern world (Lu *et al* 2003), as it occurs in any job and is even more present than decades ago. Given the value to work in society, the amount of time spent at work and the current

changes that are affecting the nature of work, it is not surprising that occupational stress appears to be increasing (Szymanzki 1999).

The problem of occupational stress has become so ubiquitous and so severe, that it is now described by United Nations International Labour Organization as a global epidemic with no occupation and no nation proving to be exempt (ILO 2001). With the development of globalization, rising competition, greater cross-national mobility and changing employment relationships, stress becomes an increasingly important occupational health problem and a significant cause of economic loss (McCraty 1998). Occupational stress is a concern not only for employees in the developed and affluent countries but is also a common concern among developing countries in the world. While stress at work is more frequently considered in the context of the industrialized countries, it is quite clear that workers in the developing countries are also undoubtedly affected (ILO 2001). Due to globalization and changes in the nature of work, people in developing countries have to deal with increasing work-related stress. In industrialized countries, people are becoming more familiar with what work-related stress is and how to manage it (WHO 2003). However, in developing countries, this may not yet be the case and only a few studies have been conducted in less developed world (Karasek *et al* 1998; Kawakami & Haratani 1999).

Occupational stress is currently one of the most costly occupational health issues. It can be seen that in this highly competitive information age, stress in the workplace has become globalized affecting all the countries, all the professions and all categories of workers. Many employees undergo stress as a nominal part of their jobs, but some experience it more severely than others do. During the past decade, the banking sector in Sri Lanka had under gone rapid and striking changes. The rapid transformation in the banking industry over the last decade has made the industry stronger, cleaner, transparent, efficient, faster, disciplined and a lot more competitive. Due to the nature of work, it can be seen that banking staff has to work under stressful situations frequently.

It can be seen that occupational stress has not been studied methodically in the banking sector in Sri Lanka while the same sector has been drastically influenced by the new policies. Standardized, validated instruments which can be administered easily to measure occupational stress are scarce in Sri Lanka. Therefore, it is intended to validate an instrument, which is being used widely in most countries in the world to bridge that gap and to obtain valid data in the field of occupational stress in the banking sector. This will enable the policy planners to plan for the betterment of the quality of life of workers. Furthermore, comparison of Sri Lankan evidence with other countries using a standardized instrument to assess occupational stress is indispensable.

It is known that employees well being can be disrupted by psychological (mental), physiological and behavioural dimensions of the stress response. Occupational stress has strong associations with non-communicable diseases such as cardiovascular diseases, diabetes, mental illnesses etc. Occupational stress is also associated with unhealthy behaviours such as smoking, physical inactivity and unhealthy eating habits and these in turn are risk factors for cardiovascular diseases and diabetes. It can be seen that the epidemic of non-communicable diseases is accelerating globally, advancing across the developing regions. It is accounted for 58.5% of mortality and 45.9% of burden of disease in the year 2002 (WHO 2002a). Non-communicable diseases caused an estimated 35 million deaths in 2005. This figure represents 60% of all deaths globally, with 80% of deaths due to non-communicable diseases occurring in low- and

middle-income countries. Cardiovascular disease (CVD) is fast becoming the commonest cause of death worldwide. According to the Global Burden of Disease Study, during 1994-1997, 30 % (15.3 million) deaths and 91.8% to burden of disease in the world were due to CVD. It is also a major cause for premature mortality and morbidity. By 2020, coronary heart disease is estimated to be the leading cause of CVD in the world. The contribution of developing countries to the global burden of CVD will soon exceed that of the developed world (WHO 2002a). South Asians provide increasing evidence for this projected trend (McKeigue *et al* 1989).

Non-communicable diseases are increasing in Sri-Lanka not only as a proportion of the burden of disease, but also in incidence and prevalence. Among the more important of these are accidents, heart disease, mental illness, diabetes and cancers (Ministry of Health 2009). Ischaemic heart disease is the number one cause of mortality in Sri-Lanka in 2002 (Medical statistical Unit 2002). The latest figures indicate a double-digit prevalence of diabetes in the urban sector of approximately 12% with a rural sector at around 7%. The more dangerous trend is a decrease in the age of onset to less than 30 years of age. As a developing country in Asia the prevalence in Sri Lanka is similar to that of India and Pakistan and is part of the epidemic. It is seen that the prevalence of diabetes has doubled in the last decade, which is an ominous sign (Sri-Lanka Diabetes Association 2009).

These diseases undermine health, shorten life expectancy, and cause enormous suffering, disability, and economic costs. However, much of this disease burden could be avoided if there was systematic application of what is known about preventing the onset and progression of these conditions (Eyre *et al* 2004). In the promotion of cardiovascular health, the traditional advice for people to stop smoking, cut down drinking, eat less fat, and engage in physical activity has been shifted towards a more holistic view. Structural and psychosocial factors, in addition to behavioural ones, are increasingly seen as important determinants of public health (Kivimaki *et al* 2002).

Worksites are considered a key channel for the delivery of health promotion interventions among adult populations. It offers an ideal setting and infrastructure to support the promotion of health of large audiences. It provides an opportunity to implement risk factor screening, identify high risk employees and integrate the delivery of health care to individual workers, their families and the community at large.

Interventions to alleviate occupational stress have multiplied rapidly over the last two decades, paralleling the increasing recognition and acceptance of the adverse impacts of occupational stress on individuals and organizations (Sabir & Heldge 2003). Countries over the world are faced with the challenge of having a healthy work force and Sri Lanka is no exception. Yet very little thought has been given to workers' health in the banking sector in our country. Therefore, it is timely to study about occupational stress, which has lot of adverse effects on worker health as well as the organizations. There is no doubt that the status of occupational stress in the banking sector of our country warrants serious consideration. Therefore, it is necessary to validate instruments with good psychometric properties which can be used in the assessment of occupational stress in the banking sector in Sri Lanka. In addition little thought has been given for occupational stress management interventions to promote health in the banking sector of our country. Since it is timely for such interventions, this study will be of importance for further developments in occupational health promotion in the banking sector in Sri Lanka.

General objective:

1. To validate three selected scales of the Job Content Questionnaire and to assess the prevalence and correlates of occupational stress in middle level managers and operational staff members of domestic commercial banks in the Colombo district.
2. To assess the effectiveness of an intervention conducted to manage occupational stress in middle level managers of domestic commercial banks in the Colombo district.

Specific objectives:

1. To validate three selected scales of the instrument titled "the Job Content Questionnaire", to assess occupational stress among middle level managers and operational staff members in domestic commercial banks.

2. To assess the prevalence of occupational stress in middle level managers and operational staff members in domestic commercial banks in the Colombo district.

3. To identify the correlates of occupational stress in the study populations.

4. To plan, implement and evaluate the effectiveness of an intervention to manage occupational stress in middle level managers in domestic commercial banks in the Colombo district.

Methodology

The study was conducted among middle level managers and operational staff in domestic commercial banks of the Colombo district and consisted of three components.

Component 1 - Validation of three major scales of the Job Content Questionnaire (JCQ), which was used for assessing occupational stress in the study populations in the second component.

Component 2 - A Cross-sectional descriptive study carried out to assess prevalence and an analytical study to assess correlates of occupational stress in the study populations using the validated three scales of the JCQ and the questionnaire on correlates.

Component 3 - A cluster randomized controlled trial which assessed the effectiveness of an intervention on occupational stress management for middle level managers of domestic commercial banks in the Colombo district.

3.1 Component 1: Validation Study

3.1.1 Study design

This validation study was carried out to validate three scales of the JCQ (Karasek 1985) which was to be used in the second component for the assessment of occupational stress in the study populations.

3.1.2 Study area

The study was conducted in Gampaha district next to the district of Colombo in the Western province.

3.1.3 Study population

The validation study was carried out on a similar group consisting of middle level managers and operational staff in domestic commercial banks, where the instrument was to be used in component two.

3.1.3.1 Selection criteria

3.1.3.1.1 Middle level managers

Inclusion criteria - Full time, permanent, middle level managers between the ages of 20-59 years, who had one or more years of service as middle level managers at the time of survey were selected for the study.
Pregnant and temporary middle level managers were excluded.

3.1.3.1.2 Operational staff

Inclusion criteria - Full time, permanent, operational staff members between the ages of 18–59 years, who had one or more than one year of service as operational staff members at the time of survey were selected for the study.
Pregnant and temporary operational staff members were excluded.

3.1.4 Sample size calculation

The calculation of the sample size for the validation can be based on one of the objectives of the validation study, which was to test the scale structure. Appropriate sample size for factor analysis is debatable. Some consider a minimum of 5 subjects per each item with a total of 100 in the multivariate statistical model would generate stable reliability and validity estimates. A sample size of 100 is considered as acceptable (Tabachnik and Fidell 1993). Thus the minimum sample size for this 22 item

instrument was 110 (1:5). It was decided to have 10 subjects per each item for the present study (1:10). Therefore, the required sample size was 220. The total sample size was calculated as 231 considering a non- response rate of 5%.

3.1.5 Sampling

There are 11 domestic commercial banks in Sri Lanka. All the domestic commercial bank branches in the Gampaha district were listed out. Twenty five bank branches were selected randomly by drawing pieces of paper with the names of the branches from a box. It was decided to take all eligible and consenting middle level managers and operational staff members in these 25 branches for the validation study. A total of two hundred and thirty subjects were recruited with 35 middle level managers and 195 operational staff members.

3.1.6 Study instruments

3.1.6.1 Selection of the study Instrument

The JCQ is a self-administered questionnaire and is designed to measure "content" of a respondent's work tasks. It includes over twenty other aspects of work and the individual such as physical aspects of work, job insecurity, and psychosocial strain "outcome" scales and has been proposed as a standardized instrument to assess job stress using three major scales based on the DC and DCS models (Karasek 1985; Johnson *et al* 1989). Description of the three major scales (in bold type) and the number of questions under each scale are given in Table 3.1 below.

Table 3.1 Three major scales of the Job Content Questionnaire and number of items

Description of the Scale/subscale	Number of items
Skill discretion	6
Decision authority	3
Decision latitude	**9**
Psychological demand	**5**
Supervisor support	4
Co-worker support	4
Social support at work	**8**

3.1.6.2 Reasons for selecting the scales of the JCQ

These scales needed to assess occupational stress have been tested in different occupational settings including employees of telephone and electric company employees, health care workers, pharmaceutical factory workers, teachers, automotive assembly workers and has been proven to have good validity and good psychometric properties (Yawen *et al* 2003; Kawakami *et al* 1995; Jian *et al* 2003). These scales which are well standardized have been used in different countries in the world (Yawen *et al* 2003; Kawakami *et al* 1995; Jian *et al* 2003) to assess occupational stress. Its extensive use around the world makes it possible to use in different languages and gives access to comparable results. It is easy to administer since it is a self-administered questionnaire with only 22 items. The selected three scales have been used in different cultural settings especially in eastern and Asian cultures to assess job stress (Yawen *et al* 2003; Kawakami *et al* 1995; Jian *et al* 2003).

3.1.6.3 Selection of items from the JCQ

A minimum set of 22 items for assessment of the three major scales decision latitude, psychological demands and social support at work needed to assess occupational stress were selected from the 49 item JCQ as recommended by the authors (Job Content Questionnaire and user's guide 1985 Revision 1.1) and adopted by researchers

(Kawakami *et al* 1995; Li *et al* 2003; Cheng *et al* 2003; Clays 2007). The decision latitude scale also known as the job control scale is the sum of two subscales: skill discretion measured by six items and decision authority measured by three items. The psychological demands scale is measured by five items. The work related social support scale is the sum of two subscales: support from supervisors and support from the co-workers, both measured by four items. For each item, the response was recorded on a four-point Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree). For each scale, a sum of weighted item scores was calculated according to the JCQ manual.

3.1.6.4 Translation of the JCQ

The objective of this part of the study was to translate the three selected scales of the JCQ before validating it for use in the Sri Lankan context. It was decided to translate the questionnaire into Sinhala language since the research was designed to be carried out among operational staff members too, majority of whom were competent in Sinhala. The JCQ was developed in the English Language in the United States of America in a western cultural background. The aim of translation was to achieve equivalence between the original English version and the Sinhala translation of the scales. This must be achieved before application or use of this mental health research instrument in a different cultural setting.

Translation is the very essence of ethnographic research and the current practice of translation and back translation of an instrument is considered to be inadequate by some (Kleinman 1987). A new combined qualitative and quantitative approach to translating instruments for cross-cultural research and consensus generation has been described (Sumathipala and Murray 2000). This method based on Nominal Group Technique was adopted in the present study to translate the three scales of the JCQ and assess the extent of agreement (consensus measurement) on the appropriateness of translation and to resolve disagreement (consensus development). The method based on Nominal Group Technique adopted for translation is described below in detail.

3.1.6.4.1 Participants for translation

The panel comprised a total of nine individuals enrolled on the basis of fluency in both English and Sinhala. Three medical doctors, three government administrative officers and three community physicians who were fluent in both English and Sinhala were recruited as panelists. A mixed group was used to ensure that no particular interest or opinion dominated in the translation process.

3.1.6.4.2 Translation procedure

Each participant was provided with the three scales of the JCQ for translation in advance of the first session. They were briefed about the methodology in simple terms describing the target populations. The translation process was described thereafter and they were asked to translate the instrument into Sinhala language. Translations were done individually by each member of the panel. They were asked to consider the total meaning of the sentence rather than concentrating on word to word translation and all 22 items were thus translated.

The 22 items of the JCQ which were selected for the assessment of occupational stress in the present study was worded using simple English without technical medical terms. Therefore, the panelists found it easier to translate most of the items without much difficulty. The participants recorded their own translations of each question on separate pieces of paper in order to rate each translation individually without any comparison,

with others during the first session. Initials of the participants were noted on the back of the piece of paper. Only one question of the original English version of the study instrument and its corresponding nine translations were taken up at a time for an evaluation and consensus generation. The translations carried out by each panelist was collected and pinned up for discussion. During the first round similar translations were grouped together. It was observed that the questions "My job requires me to be creative", "My job requires working very fast" and "People I work with are friendly" were translated by two panelists in the same way. There were no items which have been translated in an identical way by all participants and which could be acceptable for the group as the sole appropriate translation of that item. All items hence were selected following a voting.

Each participant was asked to rate independently the appropriateness (whether each translation represented the idea conveyed by the item in the original English study instrument) of the translation on a scale of 1 to 9 on the rating sheet (Annex 1) given to them. At the end, all the rating sheets were collected from the panelists. The ratings were tabulated and presented. The participants were presented with a summary of the first round ratings. These included the median and range but not individual ratings or the identity of the individual panelists. Guidelines to achieving consensus or failing to achieve consensus were predefined (Annex 2).

All the translations which achieved consensus as appropriate were submitted for the final round. Translations achieving consensus as inappropriate were excluded from further consideration. Translations failing to achieve consensus were submitted for discussion in the second round. When amendments were made, translations were regrouped if necessary and new ratings made. Participants were also given a choice to re-rate the translations during the second round, even if amendments were not made to the translations. It was made clear that the participants need not confirm to the view of the group.

The second round ratings were then tabulated and presented to assess the agreements/disagreements. Translations achieving consensus as appropriate were submitted to the third and final round in order to select the one with the highest preferences. Translations achieving consensus as inappropriate were excluded from further consideration. Translations failing to achieve consensus were also excluded from further consideration. Translations, which were considered appropriate during the first and second rounds, were then re listed, discussed and ranked during the final round to find the most satisfactory translation based on the consensus of the group. It was observed that the translation of the item "I have a lot of say about what happens on my job" posed a problem. This was not very familiar to the participants since it is not a common phrase used in Sri Lanka. This item together with "I am free from conflicting demands that others make" and "I get to do a variety of different things on my job" was agreed upon with debate compared to the other items which were agreed upon without much debate.

There was considerable debate over the translation of the words "strongly agree" and "strongly disagree". Though strongly is common for both words the same word cannot be used to denote the meanings in Sinhalese language. The final group consensus was to use "Kisiseth ekaga nowe" for "Strongly disagree" and "Bohosein ekagawe" for strongly agree.

Ranking was done by individual confidential voting on a ranking sheet to identify the

most appropriate translation for a particular item. The level of consensus required in the third round voting was decided in advance as more than 50% support from the panel. All the above mentioned steps were carried out with each item in the 22 item JCQ. The final 22 translated items were used for the preparation of the Sinhalese version of the study instrument.

3.1.6.5 Pre testing

Pre test was carried out on a convenient sample of 15 workers (5 middle level managers and 10 operational staff) in domestic commercial banks in the Gampaha district. Clarity and the relevance of translated and modified items were assessed. An insight into problems arising as a result of self-administration was identified. On the basis of the findings of the pre test, certain modifications were made to the relevant items, before using the study instrument in the validation component. The first part of the initial study instrument had a question on naming the designation of the respondent. This was modified and in the final draft the respondents were asked to indicate the category to which they belong either operational staff or middle level manager. In addition the definition of middle level manager was given within brackets and the two categories were printed in English too. In the assessment of occupational data the "service place" in the initial questionnaire was modified as "the bank" and the question was reworded as "What is the duration of service in the present bank?" instead of "What is the duration of service in the present service place?". "What is the duration of service in the current designation?" was changed to "What is the duration of service as a middle level manager?" and "What is the duration of service as an operational staff member?". No major changes were done to the second part of the study instrument with the 22 items of the JCQ other than deleting the word official work in item number 4. The final study instrument for validation was thus prepared. The time taken by the workers to complete the questionnaire was 12 minutes.

Abramson and Abramson (1999) have highlighted that differential validity should be considered when it is planned to use a study instrument that has been developed and tested by someone else. Validations done elsewhere so far suffices only if the researcher is certain that the study population and circumstances are similar to the new study, so that the methods, results and application will be valid in the new setting too. The necessary steps in the validation process were adhered to.

The finalized study instrument which was prepared for the validation process consisted of two parts. The first part consisted of socio-demographic and occupational details of the respondent while the second part consisted of the translated 22 items of the selected three scales of the JCQ which would be used to assess occupational stress in the second component.

3.1.6.6 Methods used for validation of the three selected scales of JCQ

Validity refers to how well an instrument measures the characteristics that the individual actually wants to measure (Abramson & Abramson 1999).

3.1.6.6.1 Assessment of judgmental validity

Judgmental validity assesses whether or not the conceptual definition has been approximately translated into operational terms (Abramson and Abramson 1999). Face validity, content validity and consensual validity are assessed by judgment.

Content validity was assessed by checking whether or not all aspects of the measure were covered and consensual validity was determined by assessing the agreement of the

experts on whether or not the conceptual definition has been translated approximately into operational terms in the tool. Appraising the relevance of the items to the construct under investigation assessed face validity. It was also assessed for cultural acceptability by the experts. Experts (Karasek 1985) had already evaluated the three scales of the JCQ for judgemental validity.

A Delphi Process determined the judgmental validity of the Sinhala version of the JCQ. A group of five experts in the fields of Community Medicine, occupational health field, psychiatry and clinical psychology served as the judges for the Delphi process. Assessment of content validity was done by asking the judges to rate, on a scale from zero (total disagreement) to nine (total agreement), whether the 22 items of the JCQ were appropriate indicators of the scales/sub-scales and if the composite of items in each scale/sub-scale was an adequate measure of the concept measured by that particular scale/sub-scale. In terms of consensual validation, the judges rated, again on a scale of zero to nine, whether the conceptual meaning of the original item had been adequately translated into operational terms after its translation to Sinhala and whether each item of the JCQ was culturally relevant for use in Sri Lanka. Face validity was assessed by asking the experts to rate on a scale of zero to nine whether the three selected scales of the JCQ were relevant to assess occupational stress in banking workers.

The judges' ratings for content, consensual and face validation were collated and presented for a second round of the Delphi Process. At this point, the judges re-rated their agreement with each item/scale/sub-scale and were given the opportunity to change their rating by considering the ratings given by the other judges. These re-ratings were summarized and assessed for degree of consensus.

The three-point range adopted for determining an acceptable level of consensus (Scott & Black 1991) was used in this study. It operates on the premise that, for an item/scale/sub-scale, if there is at least one rating in the range of 0-3 *and* one rating in the range of 7-9, the rating(s) furthest from the median rating be discarded before assessing consensus. Thus, the data was analyzed within three categories: 0-3, 4-6, and 7-9 (Scott & Black 1991). For both the first and second round of the Delphi Process, the decision to retain items/scales/sub-scales of the original JCQ in its Sinhala version was based on the following criteria: (a) if 70% or more of the ratings of an item/scale/sub-scale were in the category 0-3, then in the second round that item/scale/sub-scale was to be omitted from the Sinhala version (or, if in the first round, that item/scale/sub-scale was reworded to make it more acceptable if the wording were the reason for the low rating), or (b) if 70% or more of the ratings for a particular item/scale/sub-scale were in categories 4-6 and 7-9, then that item/scale/sub-scale was to be retained in the Sinhala version.

3.1.6.6.2 Assessment of construct validity

Construct validity measures the extent to which a particular measure relates to other measures consistent with theoretically derived hypothesis concerning the concepts (or constructs) that are being measured Abramson and Abramson 1999). Scott *et al* (2000) quoted Nunnally's conclusion that the assessment of the structural model of a questionnaire via factor analysis is a fundamental aspect of determining the construct validity of an instrument. Factor analysis is a data reduction technique used to assess construct validity. If the selected three major scales of the JCQ is a valid measure to be used in computation of occupational stress in the study populations described above, the scales or domains defined by its author should emerge from a factor analysis of Sri

Lankan data and items relating to a particular scale should be grouped together within a single factor. The factor becomes relevant only if its Eigen value exceeds 1.0.

3.1.6.6.2.1 Factor analysis

The appropriateness for factor analysis was assessed via the Kaiser-Olkin Measure of Sampling Adequacy (MSA) and inspection of the anti-image correlation matrix which should show low correlation across the matrix. Principal components were extracted and rotated using Varimax rotation with Kaiser Normalization.

The number of extracted factors was based on

1. The root criterion of selecting factors with Eigen values greater than 1.0.
2. The Scree test which directs the investigator to examine a plot of Eigen values and stop factoring at the point where the plot levels off.

The interpretability and meaningfulness of trial factor rotations for a rotated factor to be interpretable, each factor should have two or more loadings above 0.4 and each variable should have only one factor loading above 0.4. Additionally these variable loadings on one factor should fit logically as well. Others have used less stringent criterion of 0.3 or greater (Etter and Perneger 1997). In this study, 0.3 and above was taken as the cut off. The majority of the loadings were in excess of 0.3. Pure variables have factor loadings above 0.3 or greater on only one factor while complex variables have high loadings on one or more than one factor. Complex variables with a difference <0.2 between loadings were assigned on the basis of "logical fit" (content validity) and verification by item analysis. This choice was made to retain maximum of respondent input, while preserving the content validity and interpretability (Etter and Perneger 1997; Macheigan and Larson 1987).

3.1.6.6.3 Assessment of reliability

The validation of an instrument should also include assessment of reliability. Reliability was assessed by measuring internal consistency.

3.1.6.6.3.1 Measurement of internal consistency

Internal consistency measures the extent to which similar questions produce consistent answers or the extent to which items within the domain correlates with each other. If the items in a domain are measures of the same attribute, the extent to which it gives the same results is a function of their reliability (Abramson and Abramson 1999; McDowell and Newell 1996).

Cronbach's alpha coefficient which is the measure of the overall correlation between items within a domain was used to assess reliability. Cronbach's alpha is a function of inter-item correlation as well as the number of items. The acceptable range of alpha is usually taken as 0.60-0.90 (Cronbach 1951). Cronbach's alpha was measured for the three major scales of the JCQ to see whether it exceeded the commonly accepted minimal standard or the Nunnally's criterion of 0.70 (Bland and Altman 1986).

3.1.7 Data collection

Eight pre-intern doctors were used as research assistants. They were trained and supervised by the principal investigator. The 25 bank branches were divided among four pairs of data collectors. The subjects were recruited after obtaining informed written consent. The purpose of the study, specific instructions and an assurance of confidentiality was detailed in simple language in the form of an information sheet together with the questionnaire. A consent form was given to each an every subject to obtain informed written consent.

The study instrument consisting of the first and the second parts (Annex 3), an information sheet detailing the purpose of the study, specific instructions and an assurance of confidentiality worded in simple language (Annex 4) and a consent form (Annex 5) were given to middle level managers and the operational staff. Envelopes were given with each set of questionnaire. Respondents were asked to fill the questionnaire by themselves without discussing with others and return it under seal cover to a focal point (secretary) identified in each bank branch. Data collectors gave sufficient time and visited the branch and collected the filled and sealed questionnaires from the focal point. In case if the data collectors did not get the filled questionnaire, they once again visited the particular branch by prior appointment. Non respondents were replaced by another comparable subject.

3.1.8 Analysis

Computerized data processing and analysis was carried out by the principal investigator using software package SPSS 15 version.

3.1.9 Results and discussion of the validation study

3.1.9.1 Assessment of face, content and consensual validity

It was decided that the three selected scales of the JCQ (22 items) which was translated into Sinhala was having acceptable face, content and consensual validity according to the ratings given by the panel of experts.

3.1.9.2 Characteristics of the study sample

The response rate was 97.8% in the study population and the rate of completion of each domain was 100%. Distribution of some of the socio-demographic characteristics of the study population is shown in Table 3.2.

Table 3.2 Distribution of some socio-demographic characteristics of the validation study population (n=225)

Socio-demographic Characteristics	Number (%)
Sex	
Male	117 (52.0)
Female	108 (48.0)
Marital status	
Unmarried	87 (38.7)
Married	135 (60.0)
Divorced	1 (0.4)
Widow	2 (0.9)
Ethnicity	
Sinhalese	215 (95.6)
Tamil	3 (1.3)
Muslim	7 (3.1)
Highest educational level	
Passed GCE O/L	9 (4.0)
Passed GCE A/L	156 (69.3)
Diploma	34 (15.1)
Graduate	25 (11.1)
Post graduate	1 (0.4)
Designation	
Middle level managers	34 (15.1)
Operational staff	191 (84.9)

The mean age and the mean duration of service of the respondents were 32 years (SD=9.3 years) and 7.8 years (SD=7.9 years) respectively. The means and the standard deviations for the selected three major scales and the subscales of the JCQ are given in Table 3.3.

Table 3.3 Means and standard deviations for the selected scales and subscales of the JCQ by sex

Scale/Subscale	Total group n=225		Male n=117(52.0%)		Female n=108 (48%)	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
Decision Latitude	**59.2**	**10.7**	**59.8**	**10.8**	**58.9**	**10.6**
Skill discretion	33.3	5.1	33.3	5.0	33.4	5.3
Decision authority	26.0	8.0	26.5	8.0	25.6	7.9
Psychological demands	**36.0**	**6.2**	**35.4**	**6.3**	**36.8**	**6.0**
Social support	**24.1**	**3.4**	**24.2**	**3.3**	**24.1**	**3.5**
Supervisor support	11.6	2.1	11.6	2.0	11.7	2.1
Co-worker support	12.5	2.1	12.6	1.9	2.4	2.2

3.1.9.3 Assessment of construct validity

3.1.9.3.1 Factor analysis

The correlation matrix included several sizable correlations in excess of 0.3 demonstrating the appropriateness for factor analysis. Anti-image correlation matrix revealed that one variable with a measure of sampling adequacy falling below 0.5 was present. Since it was very closer to 0.5 it was retained for analysis. Bartlett's test of sphericity was significant (Approximate chi square=1753.96, df =231, p=<0.001). The Keiser- Meyer Olkin measure was 0.72. These measures confirmed the factorability of the data.

Explanatory factor analysis using principal component analysis was performed on the subjects. In the principal component analysis, factors extracted were considered relevant only if Eigenvalues exceeded 1.0 (Mackeigan and Larson 1989; Garatt *et al* 1993). Six factors met the Eigenvalue greater than one criterion. Scree plot revealed a scree test break at 6 factors. Factors were rotated using the Varimax rotation technique. Thus principal component analysis identified 6 relevant factors with Eigenvalues ranging from 4.289 to 1.244. Table 3.4 shows the factor co-efficient of individual items after Varimax rotation with Kaiser Normalization. The questions that are related to a particular construct are highlighted under each factor from factor 1 to factor 6. Table 3.4 shows that items 19, 20, 21and 22 are related to one construct namely factor 1. Similarly items 16, 17, 18 and 19 are related to a single construct factor 2.

Table 3.4 Factor coefficients of items in JCQ after Varimax rotation.

Item in JCQ	Factors					
	1	2	3	4	5	6
Q1 Learn new things	.201	.037	**.731**	-.156	.013	-.049
Q2 Repetitive work.	.021	.051	**.566**	.063	.207	-.218
Q3 Creative	.189	-.017	**.758**	-.040	-.058	.173
Q4 Allows to make a lot of decisions on my own	-.069	.236	.162	.138	.023	**.754**
Q5 High level of skill	-.022	.158	**.637**	.000	.047	.322
Q6 Has very little freedom to decide on work	.135	-.329	-.149	-.064	.098	**.517**
Q7 Variety of different things	.110	-.136	**.666**	.047	.055	.130
Q8 I have Lot of say	-.105	.147	.195	.163	.041	**.780**
Q9 Develop own special abilities.	.111	**.332**	**.327**	.006	.228	**.346**
Q10 Working very fast.	.056	.051	.111	.023	**.915**	.044
Q11 Working very hard.	.125	.027	.069	-.082	**.887**	.109
Q12 Not asked to do an excessive amount of work	.024	.064	-.047	**.811**	-.217	.165
Q13 Enough time to get the job done	.016	.040	-.053	**.876**	.013	.037
Q14 Free from conflicting demands that others make	-.132	.133	.030	**.812**	.114	.024
Q15 Supervisor is concerned about welfare of staff	.113	**.790**	.003	.095	.017	.093
Q16 Supervisor pays attention to what I am saying	.021	**.755**	.045	.150	.021	.041
Q17 Supervisor is helpful in getting the job done	.288	**.725**	-.063	-.074	.023	.144
Q18 Supervisor is successful in getting work together	.290	**.685**	.015	.059	.047	-.036
Q19 Coworkers competent in their jobs.	**.595**	.145	.120	-.101	.174	-.012
Q20 Coworkers take a personal interest in me	**.858**	.121	.080	.067	-.036	.023
Q21 Coworkers are friendly	**.797**	.184	.191	-.046	.094	-.016
Q22 Coworkers are helpful in getting the job done	**.778**	.128	.098	-.024	.003	-.031

In the present study, 21 variables had factor loadings above 0.3 in only one factor. (Pure variables).One complex variable had factor loadings above 0.3 in 3 factors. It was assigned to the factor on the basis of logical fit and was verified by item analysis.
Two separate factors were extracted for the scale decision latitude. The decision latitude major scale is computed from the skill discretion and decision authority subscales. This is clearly shown in the present factor analysis having separate factors for the items pertaining to the decision authority in factor 6 and items pertaining to skill discretion in factor 3. Supervisor support (factor 2) and co-worker support (factor 1) matched with the same in the original tool. Psychological demand items (5) did not define a separate factor as was demonstrated by authors of the original tool and loaded into 2 factors (factor 4 and 5). The questions that are related to a particular construct are highlighted under each factor from factor 1 to factor 6. Table 3.5 shows a summary of the relevant findings in relation to the scales of the JCQ.

Table 3.5 Distribution of the items in 3 major scales of JCQ according to the factors identified by explanatory factor analysis for the study population

Item in JCQ	Factors					
	1	2	3	4	5	6
Decision latitude						
Q1 Learn new things.			.731			
Q2 Repetitive work.			.566			
Q3 Creative			.758			
Q4 Allows to make a lot of decisions on my own						.754
Q5 High level of skill			.637			
Q6 Has very little freedom to decide on work						.517
Q7 Variety of different things			.666			
Q8 Lot of say						.780
Q9 Develop own special abilities.			.327			
Psychological job demands						
Q10 Working very fast.					.915	
Q11 Working very hard.					.887	
Q12 Not asked to do an excessive amount of work				.811		
Q13 Enough time to get the job done				.876		
Q14 Free from conflicting demands that others make				.812		
Supervisor support						
Q15 Supervisor is concerned about welfare of the staff		.790				
Q16 Supervisor pays attention to what I am saying		.755				
Q17 Supervisor is helpful in getting the job done.		.725				
Q18 Supervisor is successful in getting work together		.685				
Coworker support						
Q19 Coworkers competent in their jobs.	.595					
Q20 Coworkers take a personal interest in me	.858					
Q21 Coworkers are friendly	.797					
Q22 Coworkers are helpful in getting the job done	.778					

3.1.9.3.1.1 Item analysis

3.1.9.3.1.1.1 Item internal consistency

High and consistent correlations are assumed between an item and its hypothesized own scale. Correlations were corrected for overlap by applying the standard 0.3 (Mackeigan and Larson 1987). The item-scale correlation matrix is given in Table 3.6. This matrix was used to determine both item-internal consistency and item discriminant validity. All items met the item scale correlation criterion of 0.3.

The two items in factor 5 and the three items in factor 4 highly correlated with the assigned scale psychological demand in the original questionnaire JCQ. Items 1, 2,3,5,7 and 9 in factor 3 highly correlated with the skill discretion subscale and the decision latitude major scale. Items 4, 6 and 8 in factor 6 highly correlated with the decision authority sub scale and items 4 and 8 highly correlated with the major scale decision latitude. This is expected since the decision latitude major scale is computed by adding the skill discretion and the decision authority subscales. Item 9 which was loaded in 3 factors in the factor coefficient matrix initially, correctly highly correlated only with the skill discretion subscale and the decision latitude major scale. The scales/ subscales were subjected to the assessment of internal consistency using Cronbach's alpha.

Table 3.6 Item-total correlation for the three selected major scales of the JCQ in domestic commercial bank employees

Scale	Item	Item-total correlation
Decision latitude	Q1 Learn new things	0.533
	Q2 Repetitive work	0.390
	Q3 Requires creativity	0.646
	Q4 Allows own decisions	0.629
	Q5 High level of skill	0.670
	Q6 Little decision freedom	0.228
	Q7 Variety of work	0.563
	Q8 Lots of say	0.677
	Q9 Develop own abilities	0.558
Psychological demand	Q10 Work fast	0.432
	Q11 Work hard	0.351
	Q12 No excessive work	0.673
	Q13 Enough time	0.785
	Q14 Conflicting demands	0.779
Social support	Q15 Supervisor is concerned	0.634
	Q16 Supervisor pays attention	0.553
	Q17 Helpful supervisor	0.694
	Q18 Supervisor good organizer	0.687
	Q19 Coworkers competent	0.575
	Q20 Coworkers take interest in me	0.698
	Q21 Friendly coworkers	0.712
	Q22 Coworkers helpful	0.651

3.1.9.4 Internal consistency (Cronbach's alpha)

The JCQ would be internally consistent if the responses to the items that contribute to the same scale correlate well with each other. Internal consistency of the JCQ is shown in Table 3.7.

Table 3.7 Internal consistency (Cronbach's alpha) of the three scales of JCQ in the study population

Scale/subscale (number of items)	Men (N=117)	Women (N=108)	Total (N=225)
Skill discretion (6)	0.753	0.689	0.726
Decision authority (3)	0.605	0.614	0.612
Decision latitude (9)	**0.732**	**0.696**	**0.714**
Psychological job demands (5)	**0.592**	**0.636**	**0.611**
Co worker support (4)	0.790	0.817	0.804
Supervisor support (4)	0.765	0.810	0.787
Social support (8)	**0.796**	**0.812**	**0.804**

Cronbach's alpha exceeded Nunnally's criteria of 0.7 for all except the psychological job demand domain. It suggests that the 5 items in the psychological job demand domain did not form a uni-dimensional scale. Since alpha is a function of inter-item

correlation and the number of items where the acceptable range of alpha is taken as 0.60-0.90 (Cronbach 1951), the lower value obtained for the psychological job demand scale could partly be due to the scale length. Still the internal consistency of the psychological job demand domain in the present study is within the acceptable range of alpha which is 0.6-0.9 (Cronbach 1951).

This validation study conducted among bank employees assessed the psychometric properties of the three selected major scales of the JCQ. The selected scales were decision latitude, psychological job demands and the social support scales. When viewing the overall scales, the pattern of scores was similar with studies of other countries. The mean scores of social support in workplace were closer to those western countries of United States, Canada, Netherlands and Japan though lower a little bit (Karasek *et al* 1998). However the mean score of decision latitude was much lower, especially the decision authority subscale; whereas the mean scores of psychological demand scale were higher compared to western countries. A similar pattern was reported by Li *et al* (2004) in the validation study done in China. The subordinate is required to respect the supervisor and obey the orders of the supervisors in Sri Lankan culture. It might explain the lower decision authority and the decision latitude of the Sri Lankan workers. Li *et al* (2004) has reported similar findings in his study done in China.

Cronbach's alpha coefficients for decision latitude and social support were 0.714 and 0.804 respectively and therefore confirmed the adequacy of the internal consistencies of these scales. However the internal consistency for the psychological demand scale was the lowest of the three (Cronbach's alpha = 0.61) but comparable to those obtained in the United States, Japan, Canada and the Netherlands (Cronbach's alpha = 0.59-0.71) (Kawakami *et al* 2005; Karasek *et al* 1998). The value of the Cronbach's alpha for the psychological demand scale was higher compared to those obtained in the Chinese (Cronbach's alpha = 0.56) (Li *et al* 2004) and Taiwanese (Cronbach's alpha =0.55) (Cheng *et al* 2004) populations. Interestingly, many of the reported Cronbach's alpha coefficients for psychological demands from international studies fell below 0.70 as recommended by Kline (1979).

The explanatory factor analysis extracted 6 factors. The psychological demand scale was split into 2 factors and the decision latitude scale too was split into 2 factors. Inter-item correlation coefficients revealed that all the items had acceptable correlations with their relevant scales in the original tool. Regarding the item-total correlations "the repetitive work" had low correlation with other items within the decision latitude scale. The "repetitive work" item had been questioned by many studies for its poor consistent role in the decision latitude scale (Kawakami *et al* 1995; Kawakami *et al* 1996; Li *et al* 2004). In conclusion, this validation study demonstrated that the three scales of the JCQ which was translated into Sinhala were reliable and valid for the assessment of occupational stress in the banking employees in Sri Lanka.

3.2 Component 2

3.2.1 Study design

This cross-sectional descriptive study with an analytical component was carried out to determine the prevalence and correlates of occupational stress among middle level managers and operational staff members in domestic commercial banks in the Colombo district.

3.2.2 Study area

The study was conducted in the district of Colombo which has the highest population density in Sri Lanka. Almost 10 percent of the population of Sri Lanka resides in this district. The administrative, business and commercial centre of Sri Lanka is situated in the Colombo district.

3.2.2.1 Domestic commercial banks in the Colombo district

There are eleven domestic commercial banks registered in Sri Lanka (Central bank report 2007) with all having a network of branches in the Colombo district. This district has a larger number of branches of commercial banks compared to other districts, each bank having different numbers of branches ranging from three to fifty four. The number of branches of each commercial bank in the Colombo district is given in Annex 6. Colombo district was chosen for easy accessibility and feasibility of carrying out the study.

3.2.3 Study population

The study population consisted of middle level managers and operational staff members of domestic commercial bank branches in the Colombo district. These two categories were considered separately.

Middle level managers of domestic commercial bank branches were defined as workers whose primary job responsibility is to carry out the goals set by top management by planning, organizing, leading and controlling work within their branches. They monitor activities of subordinates and generate reports for upper management (Encyclopedia of Management 1973). Branch managers, credit managers, operations managers and assistant managers of all domestic commercial bank branches were categorized as middle level managers in all banks other than bank A. Branch managers, credit managers, operations managers and deputy managers were categorized as middle level managers in bank A.

Operational staff employees were defined as employees in bank branches other than middle level managers, secretaries, typists and supporting minor staff.

3.2.3.1 Middle level managers

3.2.3.1.1 Selection criteria

Inclusion criteria - Full time, permanent, middle level managers between the ages of 20-59 years, who had one or more years of service as middle level managers at the time of survey were selected for the study.
Pregnant and temporary middle level managers were excluded.

3.2.3.1.2 Sample size calculation for middle level managers

Sample size was calculated using the following formula for a cross-sectional survey to

determine the prevalence (Lwanga & Lameshow 1991).

$$N = \frac{Z\alpha^2 \times P(1-P)}{d^2}$$

N = Sample size
Zα = 1.96 corresponding to a confidence interval of 95% (α=0.05)
d = 0.05 level of precision
P = approximate estimate for the proportion of occurrence of occupational stress in middle level managers in banks in Sri Lanka

The variable selected to calculate the sample size in this component, was the prevalence of occupational stress. In a study done in Mexico, it was found that the prevalence of occupational stress was 26% across economic sectors (Cedillo and Grijalva 2005). Studies done in the US revealed that the prevalence of occupational stress among managers was 16% and prevalence of occupational stress in the finance and insurance sector was 12% (US department of labour statistics 1999).

The prevalence of occupational stress in the banking sector has not been studied methodically in Sri Lanka. Considering the studies done in the other countries (European Foundation for working and living conditions 1996; Smith 2000; British Labour Force survey 1995) it was decided to estimate the prevalence of occupational stress around 30%. Therefore, P was taken as 30%.
Substituting P in the above equation

$$N = \frac{1.96^2 \times 0.3(1-0.3)}{(0.05)^2}$$

$$N = \frac{3.84 \times 0.21}{0.0025}$$

N = 323
The required sample size was 323.

Sampling was done using cluster sampling method. Therefore, to increase the precision, the effect due to cluster sampling method was overcome by making a correction for design effect (d), where
d = 1+ (b-1) roh (Bennet *et al* 1991)

b = the number of middle level managers per cluster and roh = the rate of homogeneity.

Increasing the number of clusters while reducing the number of recruits from each cluster will make the clusters spread more throughout the district. It would enable to sample more widely to obtain the nuances of the district (Bennet *et al* 1991). Since most of the branches had only two middle level managers per branch it was decided to take the cluster size as two.

Rate of homogeneity or roh is a measure of variability of a particular characteristic in individuals between clusters in comparison to the variability of individuals within the clusters. Workers within a cluster may be more similar to each other than workers from other clusters. This could be due to cluster level covariates that affect workers within the cluster in the same manner and also workers within clusters may interact and therefore respond similarly. According to Bennett *et al* (1991), demographic items and questions of general morbidity conditions and measures of mortality hardly produce the same answer from two respondents in the same cluster than from two respondents in

different clusters. Therefore these variables have very small roh values close to 0, around 0.02. Occupational stress was the main variable in the present study and the presence of occupational stress is unlikely to have high variability between clusters compared to within clusters. De Silva (2007) studied the prevalence of burnout among teachers in the Southern province and he has taken the rate of homogeneity as 0.03. Therefore 0.03 was taken as the roh value for the calculation of design effect in the present study.

Substituting the above values for the equation,
d = 1+ (2-1) x 0.03
d = 1.03
The design effect calculated was 1.03
Therefore the required sample size = 323 x 1.03 = 333
Sample was increased by 10% to compensate for non response.
Final calculated sample size was taken as 366 for middle level managers.

3.2.3.1.3 Sampling technique

It is ideal to select the entire accessible population for a study, but it is not always necessary. Therefore, a smaller sample representative of the study population should be selected according to a practical and scientific way (Hulley and Cummings 1988).
Cluster sampling method using the probability proportionate to size of workers was used to identify the subjects (Bennet *et at 1991*). A sample of 366 middle level managers was obtained by including 183 clusters with two subjects in each cluster.

Stage 1

The staff strength of the middle level managers in the 11 domestic commercial banks in the Colombo district was determined based on data obtained from each bank. The total number of middle level managers was 649. The number to be selected from each bank was calculated proportionate to the total number of middle level managers working in Colombo district branches in the particular bank. Thereafter the number of clusters for each bank was calculated based on two from each branch or cluster. Table 3.8 presents the number of clusters allocated for each bank with the sampling intervals.

Table 3.8 Distribution of middle level managers by domestic commercial banks in the Colombo district

Bank	Middle level managers		No calculated	No selected for the study		No of clusters	Sampling interval
	No	%		No	%		
A	160	24.7	90	90	24.6	45	3.6
B	100	15.4	56	56	15.3	28	3.6
C	89	13.7	50	50	13.7	25	3.6
D	107	16.5	60	60	16.5	30	3.6
E	48	7.4	27	26	7.1	13	3.6
F	20	3.1	11	10	2.7	5	4.0
G	28	4.3	16	16	4.3	8	3.5
H	65	10.0	37	38	10.4	19	3.4
I	5	0.8	3	4	1.1	2	2.5
J	15	2.3	9	10	2.7	5	3.0
K	12	1.8	7	6	1.6	3	4.0
Total	649	100.0	366	366	100.0	183	

Stage 2
A list was prepared indicating all the branches in the Colombo district, with the cumulative number of middle level managers for each domestic commercial bank separately. The cluster allocation was carried out as described below.

Sampling intervals were calculated separately for each main bank by dividing the cumulative number of middle level managers of a particular main bank by the number of clusters (branches) allocated for it.

$$\text{Sampling interval} = \frac{\text{Cumulative no of middle level managers in a particular bank}}{\text{Total number of clusters allocated}}$$

The sampling intervals calculated for each bank is given in Table 3.8. The starting point in identifying the clusters was obtained by generating a random number less than the sampling interval by using a table of random numbers. The branch in which the cumulative number of middle level managers equals or exceeds the random number was located and it was taken as the first cluster for the particular bank. The sampling interval was added to the random number next, and the branch in which the cumulative number of middle level managers equals or exceeds that number was located and it was taken as the second cluster. This procedure was carried out till the required number of clusters was selected from the particular bank. The same procedure was repeated for all 11 domestic commercial banks. The list of clusters selected from each bank for middle level managers is shown in Annex 7.

3.2.3.2 Operational staff

3.2.3.2.1 Selection criteria

Inclusion criteria - Full time, permanent, operational staff members between the ages of 18–59 years, who had one or more than one year of service as operational staff members at the time of survey were selected for the study.
Pregnant and temporary operational staff members were excluded.

3.2.3.2.2 Sample size calculation

Sample size was calculated using the following formula for a cross-sectional survey to determine the prevalence (Lwanga & Lameshow 1991).

$$N = \frac{Z\alpha^2 \times P(1-P)}{d^2}$$

N = Sample size
$Z\alpha$ = 1.96 corresponding to a confidence interval of 95% (α=0.05)
d = 0.04 level of precision
P = approximate estimate for the proportion of occupational stress in operational staff in banks in Sri Lanka

The variable selected to calculate the sample size in this component, was the prevalence of occupational stress. The prevalence of occupational stress in operational staff employees in domestic commercial banks in Sri Lanka has not been studied methodically. Therefore P was taken as 50% in order to maximize the sample size (Lwanga & Lameshow 1991).

Substituting the above value p = 50% in the above equation the required sample size was

$$N = \frac{1.96^2 \times 0.5(1-0.5)}{0.04^2}$$

$$N = \frac{3.84 \times 0.25}{0.0016}$$

$$N = 600$$

Sampling was done using cluster sampling method. Therefore to increase the precision, the effect due to cluster sampling method was overcome by making a correction for design effect (d)
(d) = 1+ (b-1) roh (Bennet *et al* 1991)
b is the number of operational staff employees per cluster and roh is the rate of homogeneity.

The relevance for increasing the number of clusters is already given in section 3.2.3.1.2. Number of operational staff employees in a branch of a domestic commercial bank ranged from 5-187. It was decided to take the cluster size as 8 by considering the number of operational staff members working in the branches of domestic commercial banks. If a selected cluster (branch) had less than 8 operational staff members, the balance recruitment was carried out by visiting the branch of the particular bank, nearest to the selected cluster.

With reference to section 3.2.3.1.2 roh was taken as 0.03.
Substituting the above values for the equation,
d = 1+ (8-1) x 0.03
d = 1.21
The design effect calculated was 1.21
Therefore the required sample size = 600 x 1.21 = 726
Sample was increased by 10% to compensate for non response.
Final calculated sample size was taken as 800.

3.2.3.2.3 Sampling technique
Cluster sampling method using the probability proportionate to size of operational staff member strength was used to identify the subjects (Bennet *et al* 1991). The sample of 800 middle level managers was obtained by including 100 clusters with 8 subjects in each cluster.
This was determined by taking into consideration the fact that increase in the number of clusters would improve the representativeness of the sample.

Stage 1
Data on staff strength of the operational staff members in the 11 domestic commercial banks in the Colombo district was obtained from each bank. The total number of operational staff members was 5656. The number to be selected from each bank was calculated proportionately to the total number of operational staff members working in Colombo district branches of a particular domestic commercial bank. Thereafter the number of clusters for each domestic commercial bank was calculated. Table 3.9 presents the number of clusters allocated for each bank with the sampling intervals.

Table 3.9 Distribution of operational staff by domestic commercial banks

Bank	Operational staff		No calculated	No selected for the study		No of clusters	Sampling interval
	No	%		No	%		
A	1586	28.0	224.3	224	28.0	28	56.6
B	700	12.4	99	96	12.0	12	58.3
C	1050	18.5	148.5	144	18.0	18	55.2
D	735	13.0	104	104	13.0	13	56.3
E	493	8.7	69.7	72	9.0	09	54.8
F	170	3.0	24.1	24	3.0	03	56.7
G	150	2.7	21.2	24	3.0	03	50.0
H	653	11.5	92.4	88	11.0	11	56.6
I	25	0.5	3.5	08	1.0	01	25.0
J	62	1.1	8.8	08	1.0	01	62.0
K	32	0.6	4.5	08	1.0	01	32.0
Total	5656	100.0	800	800	100.0	100	

Stage 2

The branches of the domestic commercial banks in the Colombo district were listed separately for each bank and eleven such lists were prepared. The number of operational staff employees in each branch and the cumulative number were identified. Sampling interval was calculated using the formula described in section 3.2.3.1.3 of the methodology under middle level managers.

Sampling intervals for the eleven domestic commercial banks were calculated separately. Location of clusters was identified by probability proportionate to size. A random number less than the sampling interval was generated by using a table of random numbers. The branch whose cumulative population included the random number was identified as the first cluster. The sampling interval was then added to the random number to identify the location of the second cluster. This procedure was carried out until the allocated number of clusters for a particular bank was identified. The location of clusters for operational staff in each bank is shown in Annex 8.

3.2.4 Study instruments

This research was conducted with self-administered questionnaires, where the subjects were assured of the confidentiality of their responses. Data were collected using two study instruments.

1. Instrument 1 consisted of details on socio-demographic and occupational data of the respondent and the selected three major scales of the JCQ which was validated in component one of the study (Annex 3).
2. Instrument 11 was the questionnaire on correlates of occupational stress (Annex 9).

3.2.4.1 Study instrument 1 – Three selected major scales of the JCQ

The first part of the questionnaire collected information on socio-demographic and occupational details of the respondent and the second part contained the three selected major scales of the JCQ which was validated in the first component of the study. The three selected scales of the JCQ were used to assess the prevalence of occupational stress in the study populations.

3.2.4.2 Study instrument 11–The questionnaire on correlates of occupational stress

3.2.4.2.1 Designing the questionnaire on correlates of occupational stress

The study questionnaire was designed in consultation with the supervisors to cover the objectives of the study. In the absence of validated questionnaires pertaining to identifying correlates of occupational stress in the banking sector in Sri Lanka, a literature survey was done to identify the correlates of occupational stress identified in other studies. Several areas were identified and questions were developed to cover the relevant areas. Where appropriate, the questions used in previous studies were adapted to suit local conditions (Karasek 1985; Marmot *et al* 1991).

The questions were worded in simple language and culture sensitivity was taken into account in wording the questions. An attempt was made to make the questionnaire as short as possible. It was necessary to minimize the time spent on completing the questionnaires to avoid inconvenience as well as increase the response rate. It consisted of 18 closed ended questions and 2 open ended questions. The responses for the closed ended questions (Q5-9 and Q11-20) were recorded on a four-point Likert scale, ranging from 1 (strongly disagree), 2 (agree), 3 (disagree) to 4 (strongly agree). The responses for Q10 was recorded on a four point Likert scale, ranging from 1 (occasionally), 2 (sometimes), 3 (most of the time), 4 (always). Questions 1 and 2 had four responses with pre defined ranges. Adequate space was provided for the two open ended questions (Annex 9). Original questionnaire was developed in Sinhala and later translated into English. English translation was done only to be included in the report (Annex 10). The PI translated the questionnaire to English. A resource person translated it back to Sinhala. Discrepancies in the English translation were discussed and corrected by the PI and the resource person.

3.2.4.2.2 Structure of the questionnaire on correlates of occupational stress

The 20 questions were based on the following correlates of occupational stress identified by the literature survey (Cooper 1986; De Raeve *et al* 2007; Sparks *et al* 1997; Cartwright & Cooper 1997; Korunka *et al* 1995; Endresen *et al* 1991).

Employment characteristics

This was assessed by asking questions on the following:

1 The average monthly income
2 Monthly average income from other sources
3 Working hours per week on average
4 Distance the worker has to travel to get to the workplace

Factors intrinsic to the Job

This was assessed by

1. Data processing time
2. Frequency of computer malfunctioning
3. Perceived stress while handling cash
4. Perceived stress while handling customers
5. Frequency of abuse and hostility by customers

Personal characteristics of the worker and coping strategy

This was assessed by

1 Perceived extent of anxiety of the worker at work
2 Perceived extent of anger of the worker on trivial incidents in day-to-day life
3 Perceived ability of the worker to cope with stress at work.
4 Perceived ability of the worker to cope with stress at home.

Career development
This was assessed by the

1. Perceived job satisfaction of the worker
2. Perceived job security
3. Perceived opportunity for promotions and career development

Home work interface
This was assessed by the

1. Perceived adequacy of time for the family
2. Perceived frequency of becoming angry at home due to work problems
3. Perceived effect of family problems on the job of the worker
4. Frequency of taking office work home

3.2.4.2.3 Validity of the questionnaire on correlates of occupational stress
The questionnaire on correlates of occupational stress was reviewed by the supervisors and a set of experts from psychosocial medicine, community medicine and banking for important omissions and inappropriate choice of items and hence for the judgmental (face, content and consensual) validity. Necessary changes were made based on their recommendations.

3.2.4.2.4 Pre testing of the questionnaire on correlates of occupational stress
Pre testing of this questionnaire was carried out among a similar population in some domestic commercial bank branches in the district of Gampaha which was not planned to be included in the main study. It helped to determine the acceptability, comprehension and ease of administration of the questionnaire and difficulties in posing and responding to questions. Necessary alterations were done.

3.2.5 Data collection
3.2.5.1 Selection of the field staff
Depending on the nature of the study, the field investigators (FIs) had to travel extensively in the district of Colombo to collect data. Four male and four female pre intern medical doctors were selected as data collectors to assist the PI in the data collection.

3.2.5.2 Training of the field investigators
Training of the field investigators was undertaken by the principal investigator one week prior to commencement of field work. The purpose of the study was carefully explained. A brief overview of the objectives of the study and background information on occupational stress was given to the field staff.

The importance of assessing the eligibility criteria, taking informed consent, ensuring confidentiality and minimizing non response were also emphasized during training. The FIs were given opportunity to clarify their doubts regarding the study. Next the questionnaire was explained. PI went through the questionnaire, item by item. The training session ended with a field session to a branch that was not selected for the main study, under the supervision of the PI, following which the actual practical problems were discussed.

3.2.5.3 Method of data collection
Prior to data collection, the Deputy General Managers, Senior Managers of Human Resources in all eleven domestic commercial banks were visited by the PI. The objective of the study, sampling procedures, a brief description on methodology and

especially the questionnaires were explained to each of them by the PI and permission was taken for data collection. The respective human resources departments' e mailed all the branch managers of the branches which were selected for the study requesting them to extend their corporation, having mentioned the stipulated dates and times of visiting the bank branches by data collectors. In addition, PI verified with each branch whether they have been contacted by the respective Human Resource Departments with regard to the proposed study. At the same time, an appointment for data collection was obtained as much as possible.

Prior to data collection, an email was sent to the branch managers of the selected branches for data collection, stating the importance of the study, the method of data collection and the voluntary nature of participation by the respective Human Resource Departments of banks. Due to security reasons, exact dates with the names and the national identity card numbers of the data collectors were informed to each selected bank branch. This approach improved the reception of field investigators by the branch level employees at first contact.

PI and the eight field investigators worked as a team. Lists indicating the branches that had to be visited for data collection were prepared for middle level managers and operational staff separately. The eight data collectors worked in pairs and the Colombo district was divided into four areas by the PI and each pair was given one area. Investigators had to visit the branches more than once in most of the cases, even to distribute the questionnaires since branch level officials were very busy. Every respondent worker was given the information sheet, the consent form and an envelope along with the two questionnaires. They were advised to return the filled questionnaires under sealed cover to the data collectors. Constant supervision was done by the PI throughout the data collection period. Completed questionnaire were reviewed by the PI for omissions and completeness. The data collection was completed in 8 weeks.

3.2.5.4 Measures taken to ensure quality of data

Measures were taken to improve the quality of data both at design and implementation stages of the study.

3.2.5.4.1 Steps to minimize sampling errors

3.2.5.4.1.1 Selection bias

An accurate list of braches of all eleven domestic commercial banks in the Colombo district was prepared by obtaining data from the respective human resource departments of banks. The PI supervised the data collection procedure through out the study. In addition, the PI cross checked the accuracy of subject recruitment by checking eligibility criteria in a few in each cluster.

3.2.5.4.1.2 Non response

Timing of visits was done carefully, to minimize non response. Mondays and Fridays were avoided since those were very busy days for banking employees. The names of the data collectors with their identity card numbers were informed to the branch manager prior to visiting the branches. The PI contacted the branch managers and explained regarding the study before the data collectors visited the branches. In order to minimize refusal for participation, the subjects were made aware of the study by including details about it in the information sheet (Annex 4) given to them. Respondents were convinced that anonymity and confidentiality would be maintained. They were informed that the survey was not carried out by the bank management but independently for study purposes by a medical officer. They were instructed to return

the filled questionnaires under sealed cover to the FIs, when they visited the branches to collect those. An envelope addressed to PI was given along with the questionnaires.

3.2.5.4.2 Steps to minimize measurement errors

All respondents were middle level managers and operational staff employees of domestic commercial banks. An information sheet describing the study was provided to each respondent. Clear instructions regarding filling the questionnaires were written on the study instruments. Respondents were convinced that anonymity and confidentiality would be maintained.

3.2.5.4.2.1 Variation in the study instruments

The selected three major scales of the Job Content Questionnaire which is well standardized, was used for data collection. Pre test in a similar setting helped resolve problems related to the questionnaires.

3.2.5.5 Plans for data analysis

The questionnaires were coded. PI developed the programme for data entry using SPSS 15 statistical package. Coded forms were entered. The entered data were cleaned by checking the responses to be sure, that they fall within a range of plausible responses. Serial code of the questionnaire was noted, for the inconsistent responses. The specific questionnaire was checked again and corrections were made.

Quantitative analysis of data was carried out in component 2 of the study using SPSS version 15 computer software. Decision latitude, psychological demands and the social support scales were computed based on the formulae given in the JCQ manual (Annex 11). Means and medians were calculated for the total study populations separately for each scale. High job strain and iso-strain were calculated taking the median as the cut off in each scale. High job strain was defined as psychological demands more than the median with decision latitude less than the median. Iso-strain was defined as psychological demands more than the median and decision latitude and social support less than the median. High job strain and iso-strain were calculated separately for the two study populations. The statistical significance of associations between a single categorical independent variable and nominal dependent variables was assessed using the Chi-square test and the strength of association between the independent and the dependent variables was measured by calculating crude odds ratios and the 95 per cent confidence intervals (95% CI) in the bivariate analysis. A probability of <0.05 was considered as significant. Coding of the variables is shown in (Annex 12). Logistic regression was performed to address the effect of confounding and a detailed description on this is given in section 4.4.9.

3.2.5.6 Ethical considerations

1. Ethical clearance was obtained from the Ethical Review Board of Faculty of Medicine, University of Colombo (Annex 13). Permission and consent was obtained from relevant authorities before commencement of the study.

2. Written consent was obtained from all respondents after informing the following in the information sheet provided. The purpose of the study was to find the prevalence and correlates of occupational stress, and it would be useful for improvement of the health status of workers.

3. The information given by the respondent was treated as confidential at every stage of data collection. Anonymity of the respondent was ensured.

4. Respondents retained the right of refusing to participate in the study or to withdraw at any moment without reasoning their action.

5. The information provided would not have any immediate or future bearing on the respondent for receiving any type of healthcare.

6. All possible efforts were taken to minimize the disturbances that could occur to work of the respondents. No incentives were offered for participants or non participants in the study.

7. The data were recorded anonymously and stored confidentially. Only the principal investigator had access for data.

3.3 Component 3

This component was carried out with the aim of assessing the effectiveness of an intervention conducted to manage occupational stress in middle level managers of domestic commercial banks in the Colombo district.

This component consisted of two phases.

1. Development of an intervention to manage occupational stress in middle level managers of domestic commercial banks
2. Implementation of the intervention and evaluation of the intervention

3.3.1 Development of an intervention to manage occupational stress in middle level managers of domestic commercial banks

This phase included development of an intervention to manage occupational stress for middle level managers in domestic commercial banks in the Colombo district. In planning the intervention, a few preliminary steps were carried out prior to the commencement of the study, namely assessment of the training needs, identifying topics for the intervention and the development of the stress management material.

3.3.1.1 Assessing the training needs for the stress management intervention

The principal investigator interviewed two deputy general managers and three managers of human resources in four domestic commercial banks in order to find out their views on selecting an appropriate stress management intervention for the middle level managers. In addition to this, informal discussions were held with the middle level managers and discussed with experts in the fields of stress management and behaviour change communication, to identify the type, the duration and the mode of delivery of the stress management intervention for the middle level managers. It was highlighted that long hours could not be given to conduct workshops since the middle level managers of bank branches were very busy. It was also noticed that the knowledge on occupational stress was not satisfactory among banking employees since this topic has not been dealt much in the banks.

3.3.1.2 Communication with experts to identify the method of delivery of the intervention

A group comprising of a psychologist, two human resource managers of commercial banks, two consultant community physicians, a psychiatrist and two middle level managers outside the study area facilitated the selection of the training approach and the timing. A letter shown in (Annex 14) was sent to each individual group member mentioning the purpose and the types of occupational stress management interventions identified by literature surveys. The PI further explained to each member of the group the feasibility and the cultural suitability when choosing the intervention type over the telephone. Each member was requested to mark the degree of agreement or disagreement against the type of intervention according to the rating scale ranging from 1-4 where 1 was the least suitable and 4 was the most suitable type. They were asked to do the same for the timing of the intervention. They were given seven days to give their opinion. The scores for each type and duration given by individual group members were totaled to obtain a cumulative score. The cumulative score was converted to a percentage and is shown in Annex 15. The mode of delivery option and the timing of the intervention option with the highest percentage of agreement were chosen for further development of the intervention.

Based on the feedback, it was decided to design an intervention consisting of self learning module component and a workshop-based training component for the middle

level managers. It was also decided to allocate one week to read and understand each self-learning module and conduct a workshop of three hours duration. The workshop was planned to be conducted one week after the last self-learning module was given.

3.3.1.3 Selection of the topics for the stress management intervention

3.3.1.3.1 Perusal of available literature

A thorough literature survey was done on stress management interventions done in other countries to identify topics for self-learning modules (Pelletier *et al* 1996; Agus *et al* 2003; Tsai and Crockett 1993). Palletier *et al* (1996) developed a stress management intervention conducted by mail and telephone based on social cognitive learning theory. Based on this theory, effective behavioural change occurs in incremental steps, starting with the acquisition of new knowledge and leading ultimately to actual behaviour change. Agus *et al* (2003) conducted a stress management intervention for nurses and they too conducted a 90 minute stress educational session and a one hour practical session to impart practical skills. The topics they have used were taken into account when identifying topics for the present stress management intervention.

3.3.1.3.1.1 Topics for the intervention

Based on the literature surveys a list of topics was identified to be selected for developing the self-learning modules.

3.3.1.4 Selection of topics - Discussion with experts

The topics were selected with the facilitation of two clinical psychologists, two human resource managers of commercial banks, two consultant community physicians, a psychiatrist and two middle level managers outside the study area. A letter shown in Annex 16 was sent to the group members mentioning the purpose and topics identified during perusal of literature. The PI further explained each member of the panel regarding the importance, relevance, applicability, feasibility and the cultural suitability of the intervention in the working environment over the telephone. Each member was requested to mark the degree of agreement or disagreement against each topic according to the rating scale ranging from 1-4 where 1 was the least important and 4 was the most important topic.

They were given an opportunity to include more important topics which were not included in the letter. They were given seven days to give their opinion. The scores for each topic given by individual group members were totaled to obtain a cumulative score. The cumulative score was converted to a percentage and is shown in Annex 17. The topics which scored more than 50% were considered as valid and used to develop the self-learning modules. The final list has seven topics and includes, definition of occupational stress, symptoms of occupational stress, causes of occupational stress, effects of occupational stress, stress management by changing the way of thinking, stress management by changing the behaviour and stress management by changing the lifestyle.

3.3.1.5 Identification of content for the selected topics of the self-learning modules

A meeting was held with a psychologist, two human resource managers of commercial banks, two consultant community physicians and two medical officers working in the area of health education to identify content for the selected topics for the self-learning modules. The aims of the meeting were to identify the contents and the extent of each content area to be included in the seven self-learning modules. The group members were briefed on the topics selected for the self-learning modules. A document was prepared by the PI with the identified content for each self-learning module based on

the discussions of the meeting and approval was sought from each member of the group. A final document was prepared by the PI with the identified content for the self-learning modules (Annex 18).

3.3.1.6 Identification of content for the workshop based component

The learner centered approach (UNICEF 1997) was selected for the workshop based training. It was decided to have practical sessions on relaxation techniques for the purpose of skill development on stress management.

3.3.1.7 Development of the self-learning modules

Preparation of the seven self-learning modules was done in four phases.

3.3.1.7.1 Academic preparation phase

A panel consisting of a supervisor, a psychiatrist, two clinical psychologists, two community physicians and a health education officer facilitated the development of the self-learning modules on occupational stress management individually. Principal investigator prepared drafts of the self-learning modules based on the content identified in the previous meeting with the experts. The modules were written in English as the middle level managers were conversant in English. The modules were made self-explanatory since these modules were to be used as self-learning where a physical teacher student contact was not possible. Special attention was given, to take steps to keep the interest of the reader by stating what the trainee is expected to achieve at the beginning of the lesson. The modules were designed using simple language giving examples and avoiding long paragraphs. The fonts and line spacing was arranged to get an easy to read user friendly appearance in A4 sized paper.

The purpose of the self-learning modules was to educate the middle level managers about occupational stress, the symptoms, causes and effects. Last three modules focused on simple ways of stress management. Each self-learning module consisted of the study topic, objectives of the module, lesson content and exercises. Each module had learning objectives on the first page. Simple questions were given after each module to ensure that the respondent had gone through the modules. The PI visited each panel member and handed over the modules for scrutinizing. The PI went and collected the scrutinized drafts after 1 week. The panel members were especially concerned about the technical content, usage of simple language, attractiveness and the length of the modules. The modules were redrafted taking into consideration the suggestions made by the members. The redrafted copies were handed over to each member again. Later, editing was done by an experienced consultant community physician and the pre final draft was handed over to the members for final scrutiny. There were no further changes and the approval was obtained.

3.3.1.7.2 Testing for readability of the self-learning modules

Readability was tested by using the "Cloze test" (Folmer *et al* 1992). A passage of the text containing approximately 250 words was selected and starting from the third line every fifth word was deleted. Each page was photocopied and the copies were given to ten middle level managers outside the study area to fill in the words in the blank spaces. Later the PI checked whether they had filled the blanks with the same word which was deleted or a word with a similar meaning. The readability score was calculated as 75% (50% or more was taken as the cut off).

3.3.1.7.3 Field testing of self-learning modules

Pre-testing of the draft self-learning modules was carried out during this stage. The

modules were administered to a group of 10 middle level managers in Gampaha District. They were requested to study the modules and make any suggestions with regard to the modules. The questions asked were 'are the contents relevant and at the right level for the reader?' to assess usability, 'is the information well structured and easy to find?' to assess accessibility, and 'is the text readable?' to assess the readability of the self-learning modules.

3.3.1.7.4 Finalizing the self-learning modules

Preparation of the final draft was carried out during this stage. Necessary modifications were made to the draft based on the shortcomings identified during the field testing. There were suggestions not to use technical terms for diseases, but to use lay terms. It was suggested to reduce the number of pages in modules six and seven.

3.3.1.7.5 Printing of self-learning modules

Final drafts were made. Seven self-learning modules were printed using seven different colours (Annex 19).

3.3.1.8 Developing the workshop based Stress management component

Power point presentations were prepared for each of the seven self-learning modules by the PI to be discussed at the workshop based component. It was handed over to each member of the panel for necessary amendments. A panel consisting of a supervisor, a psychiatrist, two clinical psychologists, two community physicians and a health education officer helped in the development of the occupational stress management workshop. Two weeks later a discussion was held about the power point presentations and necessary changes were done. Amended presentations were handed over to each member of the panel by the PI by visiting them. One week later, all the suggestions were pooled and further changes were made. It was suggested to increase the time duration for practical sessions. The final presentations were handed over to each panel member and approval was obtained.

3.3.1.8.1 Features of the workshop

The initial part of the workshop was used to discuss the seven self-learning modules using power point presentations. The participants were given a chance to actively participate in this session by asking questions to clarify their doubts and to share their own experience with regard to occupational stress in their work settings. Brain storming sessions were applied to enhance active involvement and learning. Energizer exercises were used and open discussions were included on any other concerns relevant to each topic for sharing of experience. The later part of the work shop was on relaxation techniques. Participants were trained on breathing exercises and muscle relaxation exercises. They were trained to practice these techniques even while at work.

3.3.1.8.2 Pre testing of the workshop based session

Pre testing of the workshop based training session was conducted among 10 middle level managers who were not involved in the research. Amendments were made according to the results of the pre test. These included reducing the time for the power point presentation, increasing the time for the practical sessions and discussions.
After making the necessary changes, workshop based training component was finalized.

3.3.1.8.3 Orientation of the workshop for the trainer

The facilitator who implemented the workshop based training needed to be trained with the content of the workshop on occupational stress management. The facilitator chosen

for the workshop based training was a consultant psychiatrist. He was given the power point presentations to be used at the workshop based occupational stress management component. The PI discussed with him the objective of the workshop and presentation methods. Facts such as voice tone and clarity in speaking using simple words showing that the teacher is interested were highlighted.

3.3.2 Implementation and evaluation of the intervention

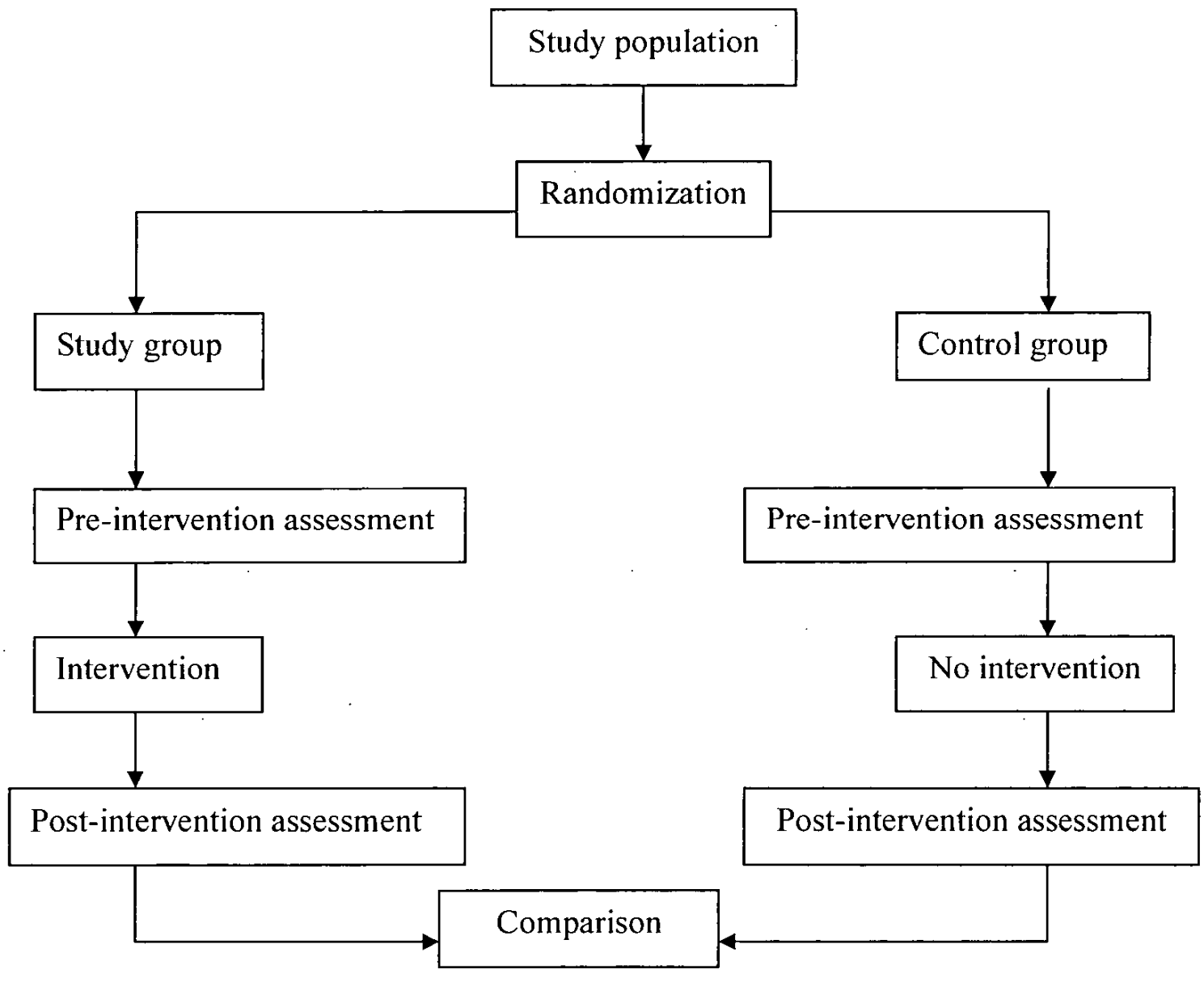
The experimental study was carried out in four domestic commercial banks in the Colombo District. It was implemented in three phases.

Phase 1
Pre-intervention assessment with questionnaires
Phase 11
Implementation of the intervention
Phase 111
Evaluation of the intervention by post-intervention assessment with questionnaires

3.3.2.1 Study design

A cluster randomized controlled study, comprising of study and controls on randomly selected clusters of middle level managers in domestic commercial bank branches in the Colombo district, with pre and post intervention collection of data was done to assess the effectiveness of the stress management intervention. A control study group was selected to control for the possibility that the changes in stress levels were not a part of a secular trend.

Figure 1: Schematic presentation showing the sequence of events in component 3.3.2



3.3.2.2 Study area

The study was conducted in four randomly selected domestic commercial banks in the Colombo district.

3.3.2.3. Study population

The study population consisted of middle level managers of the four randomly selected domestic commercial bank branches in the Colombo district.

3.3.2.4 Selection criteria

Inclusion criteria - Full time, permanent, middle level managers in bank branches between the ages of 20-59 years, who had one or more years of service as middle level managers at the time of the pre-intervention data collection and who would not leave the particular branch for a period of nine months after the pre-intervention data collection, were selected for the study.

Pregnant or temporary middle level managers were excluded. Middle level managers on long leave or on transfer orders too were excluded. It was decided to exclude any other middle level manager who might be transferred to the study area after the commencement of the study.

3.3.2.5 Sample size calculation

True difference in the intervention and the control groups following the stress management intervention had to be detected. Therefore the following equation was used for sample size calculation for a dichotomous variable (Pocock 1984)

$$N = \frac{P1 \times (100-P1) + P2 \times (100-P2) \times f(\alpha\beta)}{(P2-P1)^2}$$

P1 = percentage of occupational stress expected on pre intervention group (30%)
P2 = percentage of occupational stress on the intervention group which one desires to detect as being different from P1 (10%)
α = the level of the significance test used for detecting an intervention difference (often set = 0.05).

$1-\beta$ = the degree of certainty that the difference P1-P2 if present would be detected (often set = 0.90)
P1 = 30% (This was the prevalence of occupational stress taken in the cross-sectional component of the study for middle level managers)
P2 = 10%
α = 0.05
β = 0.1
$f(\alpha\beta)$ = 10.5 (Pocock 1984)
The effect size for this study was taken as 20% (Van der Klink *et al* 2001)

$$N = P1 \frac{\times (100-P1) + P2 \times (100-P2) \times f(\alpha\beta)}{(P2-P1)^2}$$

$$N = \frac{30 \times (100-30) + 10 \times (100-10) \times 10.5}{(10-30)^2}$$

$$N = 79$$

Since cluster sampling was done, correction for design effect was done to increase the precision. In the present study, the study and the control groups had unequal sized cluster sizes ranging from 2-7. Therefore, the design effect for a cluster randomized trial with unequal cluster sizes was calculated as follows.

$d = 1+ \{(cv+1) m-1\} \rho$ (Eldridge *et al* 2006)
cv is the coefficient of variation of cluster size
Roh is the rate of homogeneity
m = average number of middle level managers in a cluster

Values for the coefficient of variation of cluster size could not be found from Sri-Lankan studies. According to Eldridge *et al* (2006) the coefficient of variation of cluster size (cv) calculated from several cluster randomized controlled trials commonly had a value of 0.65 on average which in turn could result in sample size increases up to 42%. Therefore, the cv for the present study was taken as 0.65.

Cv = 0.65 (Eldridge *et al* 2006)
m = 2.7
ρ = 0.03 (De Silva 2007)
d = 1.08

According to Hauck *et al* (1991) the design effect for a cluster randomized trial with unequal sized clusters can be calculated as follows.

$d = 1+ (n-1) \rho$
d = design effect
ρ = rate of homogeneity
n = average cluster size
n = 2.7; ρ = 0.03 (De Silva 2007)
Substituting the above values
$d = 1+ (2.7-1) \times 0.03$
d = 1.05

Considering the two values obtained for the design effect using the above two methods, it was decided to take 1.08 as the design effect for the present study to maximize the sample size.

Therefore, the required sample size considering the design effect N = 79 X 1.08 = 85
Considering non response of 5% the total sample size in one arm = 90

3.3.2.6 Sampling technique

3.3.2.6.1 Selection of study and control groups

Randomization of cases and controls is an important feature of experimental studies. This was achieved through cluster randomization. In cluster randomization instead of individuals, groups of subjects of the study and the control groups are randomly assigned as a whole to either the study or control (Hauck *et al* 1991). However the unit of analysis is still the individual.

3.3.2.7 Selection of clusters

Out of the 11 domestic commercial banks in the Colombo district, four banks were selected randomly for the experimental study in component three. Out of the four selected banks, two were selected as the study group and two were selected as the control group randomly.

A cluster was regarded as a branch of a domestic commercial bank selected for the experimental study in component three. A list was prepared indicating all the Colombo district branches of the two study domestic commercial banks with the number of

eligible middle level managers. The number of eligible consenting middle level managers per each cluster in the study and control groups ranged from 2-7. Considering the cluster size as 2 it was decided to select 45 clusters (90/2) each from the study and the control groups. Random numbers were drawn to identify the branches (clusters) for the study and the control groups. The selected clusters for the study and control groups are given in (Annex 20).

3.3.2.8 Study instruments

The study instruments were self-administered questionnaires. This was feasible and effective since the managers were a homogenous group with satisfactory level of education. Self-administered questionnaires had to be used since the middle level managers were very busy. Self-administration of the questionnaires and confidentiality would ensure truthfulness of the responses.

1. Instrument 1 consisted of details on socio-demographic and occupational data of the respondent and the three scales of the JCQ which was validated in component one of the study
2. Instrument 11 was the General Health Questionnaire 30 (Annex 21)

3.3.2.8.1 Study instrument 1 –The three selected scales of the JCQ

The first part of the questionnaire collected information on socio-demographic and occupational details of the respondent and the second part contained the three selected scales of the JCQ which was validated in the first component of the study. The three selected scales of the JCQ were used to assess the prevalence of occupational stress in the study population.

3.3.2.8.2 Study instrument 11 – The General Health Questionnaire 30

The GHQ is a self-administered screening instrument developed by Goldberg (1972) aimed at assessing the mental health status of the non patient population in terms of being a probable psychiatric case.

This was designed to cover four identifiable elements of distress; depression, anxiety, social impairment and hypochondriasis. Although the GHQ does cover separate types of distress, it is not intended to distinguish psychiatric disorders or to be used in making diagnosis. The GHQ 30 was used in this study since it is the most widely validated version of the GHQ in community and occupational settings to assess psychological distress (Goldberg and Williams 1995). It has already been validated for Sinhala Speaking population in 1987 (Rodrigo 1987- personal communication) and further validated and used in several studies (Samarasinghe and De Silva 1990) and was found to be acceptable. The GHQ scoring method (Goldberg and Williams 1995) was adopted and a cut off score of 6 was used to differentiate poor psychological status ($\geq$6) from good psychological status (<6). The GHQ 30 has been used in other intervention studies (Orpen 1984; Tsai and Crockett 1993; Carson *et al* 1999) to assess the effectiveness of individual level stress management interventions.

3.3.2.9 Data Collection

3.3.2.9.1 Selection of the field investigators

The field investigators were required to travel extensively in the district of Colombo to collect data. Four male and four female pre intern medical doctors were selected as data collectors to assist the PI in the data collection. Being a "doctor" would be an additional advantage as they would be recognized and accepted by the banking staff which would in tern facilitate the data collection process. The data collectors worked in pairs.

3.3.2.9.2 Training of the field investigators (FI)
A training session was conducted by the PI during which the study design and the objectives were explained to the FIs. The data collection tools too were introduced. All questions were discussed in detail and the FIs were given the opportunity to clarify any doubts regarding the contents of the instruments. The importance of maintaining the anonymity of the participants was emphasized. The FIs were given the opportunity to administer the questionnaires with the PI on the first day of data collection. At the end of the activity any practical problems encountered were discussed and rectified.

3.3.2.9.3 Pre-intervention collection of data
Permission to conduct the study was obtained from the relevant managers and deputy general managers of each bank. The PI briefed all the deputy general managers' on the objectives of the study, mode of data collection and requested their cooperation. In addition, a letter containing the details of implementation of the stress management intervention was sent separately to each bank.

The principal investigator contacted the middle level managers and a date and a time was scheduled in advance for the administering of questionnaires. The names and identity card numbers were notified to each bank branch from which data collection was done. When the data collectors visited one branch they explained about the intervention to all the eligible middle level managers in that branch individually. All middle level managers were given an assurance of the confidentiality of the data collected and were informed that individual performance would and not be made available to their supervising officers or any persons including their colleagues and would not in anyway affect their future career prospects.

Informed written consent was obtained prior to administering the study instruments for the pre-intervention assessment. Thereafter each middle level manager was given the three validated scales of the JCQ in component one and the GHQ 30 together with an envelope addressed to the PI. They were asked to fill the questionnaires and return it under sealed cover to the data collectors when they visited the branch after two days. Participants were requested not to write their names on the questionnaires and they were asked to fill the questionnaires without discussing with others.

The questionnaire on basic socio-demographic data was scrutinized for their completeness. Data collection was carried out before the intervention in both control and the intervention areas. Data collection was done under close supervision of the PI. The intervention was implemented in the study area next.

3.3.2.9.4 Implementation of the intervention
The stress management intervention consisted of seven self-learning modules followed by a three hour workshop on stress management. Once the questionnaires were returned they were given the self-learning modules one by one weekly. The middle level managers were requested to go through the simple two to three paged modules during a week and answer the simple questions on a separate sheet which they were requested to bring after one week. If the middle level managers had any doubts, they were given the contact numbers of the PI to seek clarifications. The next module was introduced a week later. All answered questions of the previous module were collected by the FI. This was done to ensure that the managers had gone through the previous module. All the modules were distributed weekly to the middle level managers. The workshop was arranged once all the modules were given.

3.3.2.9.5 The stress management workshop

The stress management workshop was conducted by a senior consultant psychiatrist who is a specialist in the field of stress management. The duration of the workshop was three hours and the study subjects were given practical training on stress management according to the training guide prepared by the PI. Four such workshops were conducted by him for the intervention group on two consecutive weeks. The first workshop was conducted one week after the distribution of the final self-learning module. Four workshops had to be conducted since the manager and the assistant manager of a particular branch could not come at the same time and also the sample size was larger. Therefore, four workshops with 25 middle level managers in each workshop were conducted in two consecutive weeks at the respective training centers of the banks.

3.3.2.9.6 Post-intervention collection of data

This was done in the study and control groups six months after the intervention, using the same pre-intervention data collection instruments.

3.3.2.10 Data entry and analysis

Data entry was similar to that described in the cross-sectional component. Data were analyzed using SPSS version 15 software package. Descriptive analysis of the intervention component was similar to the cross-sectional component. Pre- intervention basic socio-demographic and service data of the study and the control groups were compared to assess comparability of the two groups. Iso-strain was defined as having scores of decision latitude and social support below the median cut off with psychological demands above the median cut off. A score of $\geq$6measured using the GHQ 30 was considered as having psychological distress while a score of <6 was considered as absence of psychological distress. Chi-square tests were performed to detect significant differences with regard to outcome variables (iso-strain and psychological distress) at pre and post interventional levels. Chi-square is a statistical test of significance and it requires that the data be in nominal form, or the actual number of cases that fall into two or more discrete categories. Comparison of the change in the outcome variables in the study and the control groups was assessed by McNemar chi-square test. McNemar test uses chi-square for the analysis of nominal data from correlated samples. A probability of <0.05 was considered as significant.

Compliance of the intervention was assessed using several methods. Compliance to self-learning modules was assessed by collecting the answer sheets written by the study subjects for the questions given at the end of each module. It was also assessed by looking at the scribbling marks on the previous self-learning module before distributing the next module by the FIs. Compliance to the stress management workshop was assessed by looking at the participation rates. Compliance to the stress management intervention package was assessed by way of self-reported measures at the end of six months.

3.3.2.11 Quality of data

3.3.2.11.1 Measures to improve quality of data

The following methods were used to improve the quality of data.

3.3.2.11.1.1 During development of the modules

A team of experienced professionals on the relevant fields were used as resource personnel. The modules were made simple, self explanatory and presented in a user

friendly manner. Data collection tools and the modules were pre tested in order to identify and rectify any deficiencies.

3.3.2.11.1.2 During the baseline survey

Pre-intern medical graduates were employed as the field assistants to ensure acceptability of the research assistants by the banking employees. The pre-intern medical graduates were trained in implementing the stress management intervention. All the field investigators were given a comprehensive training in order to maintain uniformity in conducting the study. Data collection was carried out within the shortest possible period to minimize cross contamination. The questionnaires were not lengthy and it was made simple. This ensured easy answering .The study instruments were self-administered questionnaires and they were worded in simple language to prevent ambiguity. As this was a self-administered questionnaire, the respondents were more likely to answer honestly. Socio-demographic questions were asked initially to make the respondent be at ease and the questions on psychological assessment were included next. It was also explained that the research was carried out not on behalf of the banks but as a part of an academic exercise. The PI kept a close inspection of the data collection. PI visited almost all the branches which were selected for the intervention study without informing the data collectors. Questionnaires were checked again by the PI for any missing items.

3.3.2.11.1.3 During implementation of the intervention and post-intervention assessment

Pre-testing of the draft modules were done to ensure that all participants were able to comprehend and use the modules. Distributing the self-learning modules by visiting the branches and collecting the answers for the modules each week ensured compliance. Organizing the stress management workshop at the respective training centers of the study group banks and conducting the workshop during banking hours without interfering their official work, were planned to increase compliance. The study group participants were contacted over the phone three and five months after stress management intervention and asked whether they were practising what was done in the intervention. The contact details of the study as well as the control group participants were recorded clearly to minimize loss to follow up. In addition, they were told to inform the PI in case of change of contact details.

The same study instruments were used in both pre- and post-intervention assessments.
PI entered data and rechecking and cross checking was done following data entry. Any inconsistent or missing responses were traced back to the questionnaires and re corrected.

3.3.2.11.2 Reliability and validity of data

The three selected scales of the JCQ used in this component and GHQ 30 were validated in Sri Lanka. These questionnaires have a good internal consistency.

3.3.2.12 Ethical considerations

At the onset of the study, ethical clearance was obtained from the Ethics Review Committee of the Faculty of Medicine, University of Colombo. Permission to carry out the study was obtained from the relevant authorities of the intervention and control domestic commercial banks. Informed consent was obtained from all participants. They were given the liberty to withdraw from the study without any prior notice. Data collection was carried out with minimal interference to routine duties of the participants. All data were considered confidential.

Chapter 4

Results

Component 1 of the study assessed validity and reliability of three selected scales of the JCQ and the results with the discussion are shown in section 3.1 in "Methodology".

Component 2 was a cross-sectional descriptive study carried out to assess the prevalence of occupational stress in middle level managers and operational staff in domestic Commercial banks. It also consisted of an analytical component aimed to describe the correlates of occupational stress in the two study populations.

Component 3 was a randomized controlled trial carried out to assess the effectiveness of a stress management intervention conducted among middle level managers of domestic commercial banks.

4.1 The study populations

The study populations consisted of 366 middle level managers and 800 operational staff members of domestic commercial banks in the Colombo district. The study samples were selected to ensure accurate representation of the target populations of middle level managers and operational staff members in 11 domestic commercial banks. The middle level managers were drawn from 183 clusters consisting of 2 middle level managers in each cluster and operational staff members were drawn from 100 clusters with a cluster size of 8. The selection procedure is given in detail in section 3.2.

4.1.1 Response of the study populations

Thirteen middle level managers of the 366 selected did not respond. Hence the response rate for middle level managers was 96.4%. Sixty seven operational staff members of the 800 selected did not respond hence the response rate for this category was 91.6%. The latter part of the data collection in component two was carried out in November and December months and some middle level managers and operational staff members had gone on annual leave after receiving the questionnaires. Two middle level managers had gone abroad and one middle level manager and two operational staff members were transferred to outstation branches. Ten operational staff members had misplaced the questionnaires and therefore could not be collected.

4.2 Characteristics of the respondents of the two categories

4.2.1 Demographic characteristics of the respondents

Basic demographic characteristics of the respondents in the cross-sectional study are given in Table 4.1.

Table 4.1 Distribution of the study groups by demographic characteristics

Variable	Middle level managers N = 353		Operational staff members N = 733	
	n	%	n	%
Age group in completed years				
20-24	0	0.0	187	25.5
25-29	3	0.9	182	24.8
30-34	15	4.2	138	18.9
35-39	77	21.8	106	14.4
40-44	67	19.0	33	4.5
45-49	71	20.1	27	3.7
50-54	97	27.5	51	7.0
55-59	23	6.5	09	1.2
Ethnicity				
Sinhalese	315	89.2	687	93.7
Tamil	27	7.7	25	3.4
Moor	06	1.7	16	2.2
Burgher	03	0.8	04	0.6
Other	02	0.6	01	0.1
Sex				
Male	219	62.0	344	46.9
Female	134	38.0	389	53.1

The age ranged from 25-59 in completed years for middle level managers while it ranged from 20-59 in completed years for the operational staff members. Mean ages were 45.1 years (SD=6.9 years) and 31.7 years (SD=8.9 years) for middle level managers and operational staff members respectively. The majority of the respondents were Sinhalese in both categories. Middle level managers consisted of 219 (62%) males while operational staff members consisted of 344 (46.9%) males.

4.2.2 Socio-economic characteristics of the respondents

Selected socio-economic characteristics of the respondents are given in Table 4.2.

Table 4.2 Distribution of selected socio-economic characteristics of the respondents

	Middle level managers (N=353)		Operational staff members (N=733)	
	n	%	n	%
Level of education				
Passed O/L	09	2.6	17	2.3
Passed A/L	176	49.9	542	73.9
Diploma	89	25.2	121	16.5
Graduate	64	18.1	48	6.6
Post Graduate	15	4.2	05	0.7
Marital status				
Unmarried	20	5.7	306	41.7
Married	323	91.5	419	57.2
Divorced/Separated	6	1.7	06	0.8
Widow	4	1.1	02	0.3
Present monthly income (Rs)				
Rs 10,000 - 29,999	0	0.0	371	50.6
RS 30,000 – 50,000	178	50.4	339	46.3
More than 50,000	175	49.6	23	3.1

It was observed that 168 (47.5%) middle level managers had educational qualifications of diplomas and above with 169 (23.8%) operational staff members having the same qualifications. Three hundred and twenty three (91.5%) middle level managers were currently married while 419 (57.2%) operational staff members were currently married. It was seen that 371 (50.6%) operational staff members had a gross monthly salary of less than 30,000 rupees while none of the middle level managers drew a salary less than 30,000 rupees.

4.2.3 Occupational characteristics of the respondents

Selected occupational characteristics of the respondents are given in Table 4.3.

Table 4.3 Distribution by selected occupational characteristics of the respondents

	Middle level managers (N=353)		Operational staff members (N=733)	
	n	%	n	%
Service in the currently working bank (years)				
1-5	6	1.7	265	36.1
6-10	16	4.5	195	26.6
11-15	46	13.0	138	18.8
16-20	100	28.3	49	6.7
21-25	45	12.8	18	2.5
26-30	108	30.6	55	7.5
31-35	29	8.2	13	1.8
36-40	3	0.9	0	0.0
Service in the currently working branch (years)				
1-5	315	89.2	672	91.7
6-10	38	10.8	61	8.3
Years of service in the present category				
1-5	210	59.5	267	36.4
6-10	107	30.3	194	26.5
11-15	33	9.4	139	18.9
16-20	3	0.8	49	6.7
21-25	0	0.0	16	2.2
26-30	0	0.0	55	7.5
31-35	0	0.0	13	1.8
Average hours of work per week				
40-49	67	19.0	229	31.2
50-59	199	56.4	385	52.6
60-69	82	23.2	97	13.2
70-79	5	1.4	21	2.9
80-89	0	0.0	1	0.1
Distance from the current place of residence to the place of work (Km)				
1-10	154	43.6	357	48.7
11-20	155	43.9	241	32.9
21-30	31	8.8	75	10.2
31-40	6	1.7	24	3.3
>40	7	2.0	36	4.9

Majority 285 (80.6%) of the middle level managers had more than 15 years of service in the currently working bank but the majority of operational staff members 598 (81.6%) had a service of 15 years or less in the currently working bank. The mean service in the currently working bank was 21.8 years (SD=7.3 years) for middle level managers while it was 9.9 years (SD=8.1 years) for the operational staff members. The mean service in the currently working branch was similar in both categories and it was 2.8 years (SD=1.7 years) for middle level managers and 2.8 years (SD=1.6 years) for operational staff members. Mean service as a middle level manager in the middle level manager category was 5.7 years (SD=3.4 years) and the mean service as an operational staff member was 9.8 years (SD=8.1 years) in the operational staff category. The mean hours of work per week was 52.9 (SD=6.7 hours) in the middle level manager category while it was 50.7 hours (SD=6.9 hours) in the operational staff category.

The median distance from the current place of residence to the place of work was 12 km in middle level managers with a range of 1-85 km while it was 11 km in the operational staff members with a range of 1-115 km.

4.3 Prevalence of occupational stress

4.3.1 Calculation of median and mean values for the scales/subscales of the JCQ selected for the study

A sum of weighted item scores was calculated according to the formulae given in the JCQ manual (Annex 11) for each subscale/scale of the JCQ selected to assess occupational stress (high job strain and iso-strain) for this study. The median values for each scale is given below in Table 4.4 for middle level managers and operational staff members and the mean scores are given in Table 4.5 for the two study populations.

Table 4.4 Median and the range for the three selected scales of the JCQ by study populations

Scale of JCQ	Middle level managers N=353		Operational staff members N=733	
	Median	Range	Median	Range
Decision latitude	66	36-92	58	26-94
Psychological demand	34	21-48	35	18-48
Social support at work	24	14-32	23	9-32

Table 4.5 Mean values for the three selected scales of the JCQ by study populations

Scale of JCQ	Middle level managers N=353		Operational staff members N=733	
	Mean	SD	Mean	SD
Decision latitude	66.5	8.7	59.1	8.7
Psychological demand	34.8	4.9	35.4	4.9
Social support at work	23.6	3.1	22.6	3.5

Table 4.6 and Table 4.7 show the median, range, mean and standard deviation values for the three selected scales/subscales of the JCQ by sex for middle level managers and operational staff members respectively.

Table 4.6 Median, mean and standard deviation values for the three selected scales/sub scales of the JCQ in middle level managers by sex

Scale/subscale	Female middle level managers (n=134)				Male middle level managers (n=219)			
	Median	Range	Mean	SD	Median	Range	Mean	SD
Skill discretion	34	24 - 46	34.8	4.4	34	18 - 44	34.1	3.9
Decision authority	32	20 - 48	31.9	6.3	32	12 - 48	32.3	6.0
Decision latitude	67	44 - 90	66.7	9.1	66	36 - 92	66.4	8.4
Psychological demands	34	21 - 48	34.9	5.2	34	23 - 48	34.7	4.7
Supervisor support	12	6 - 16	12.1	3.3	12	8 - 16	11.9	1.4
Co-worker support	12	4 - 16	11.9	1.7	12	4 - 16	11.5	2.1
Social support	24	14 - 32	23.9	2.2	24	14 - 32	23.4	3.1

Table 4.7 Median, mean and standard deviation values for the three selected scales/sub scales of the JCQ in operational staff members by sex

Scale/subscale	Operational staff members							
	Females (n=389)				Males (n=344)			
	Median	Range	Mean	SD	Median	Range	Mean	SD
Skill discretion	32	18 -68	32.3	4.7	32	14 - 46	32.2	4.5
Decision authority	28	12 -44	27.5	6.0	24	12 - 60	26.2	6.5
Decision latitude	60	36 -94	59.7	8.6	58	26 - 90	58.4	8.8
Psychological demands	35	24 -48	35.3	4.9	36	18 - 48	35.5	4.9
Supervisor support	12	6 - 16	11.3	1.6	12	4 - 16	11.2	1.9
Co-worker support	12	4 - 16	11.3	2.0	12	4 - 16	11.4	2.3
Social support	23	11- 32	22.6	3.2	23	9 - 32	22.7	3.8

4.3.2 Assessment of high job strain and iso-strain

The median of each scale was taken as the cut off for the assessment of high job strain and iso-strain in workers as recommended by the authors of the JCQ and used by several others (Aziah *et al* 2004; Huda *et al* 2004; www.jcqcenter.org). According to the demand-control model, workers with psychological demands more than the median with decision latitude less than the median belong to the high job strain category. According to the demand-control-support or the extended model, workers with high job strain with social support at work less than the median belong to the iso-strain category. Assessment of high job strain and iso-strain in the two study populations is given below in figure 2 and figure 3.

Figure: 2 Assessment of high job strain and iso-strain in middle level managers

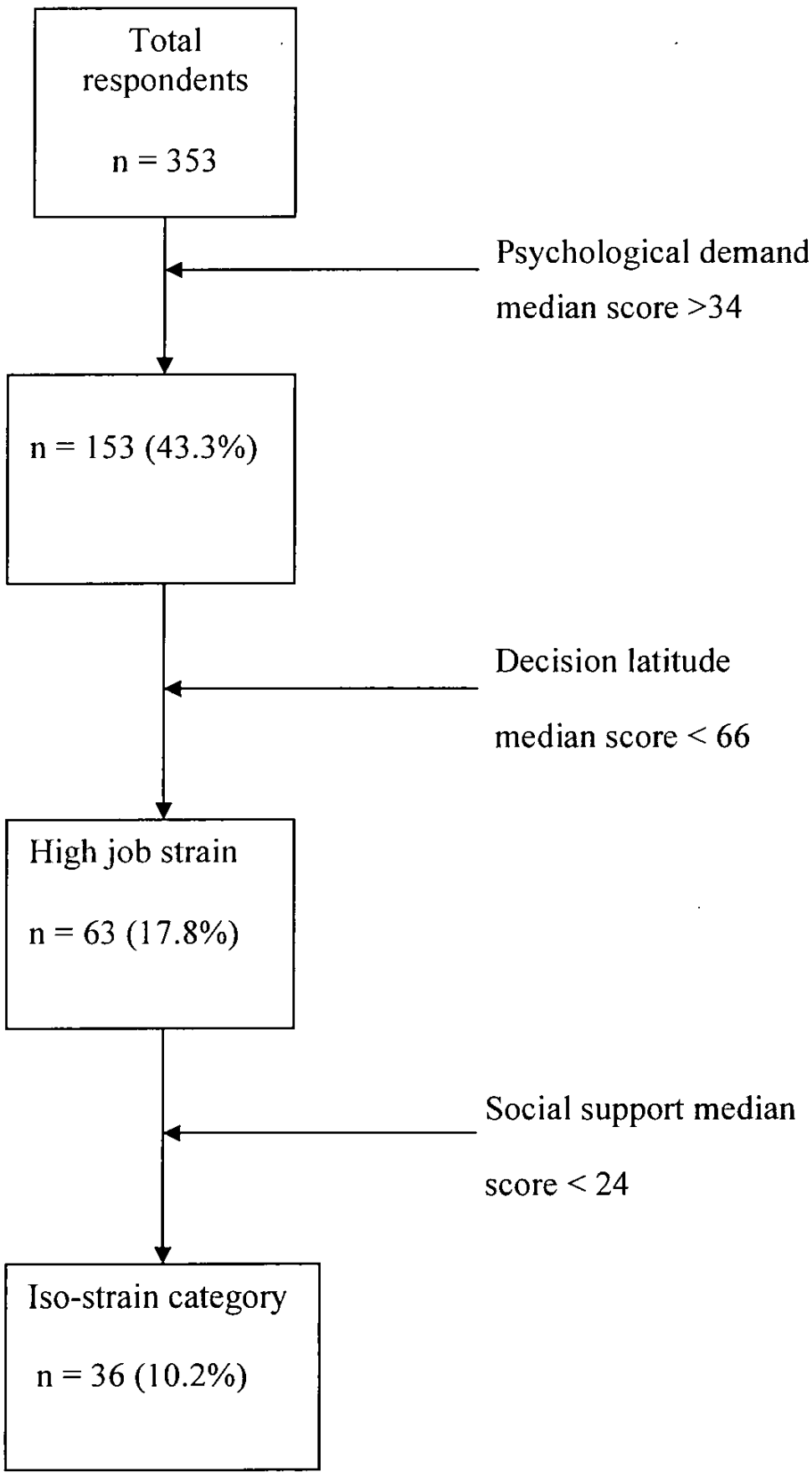


Figure 3: Assessment of high job strain and iso-strain in operational staff members

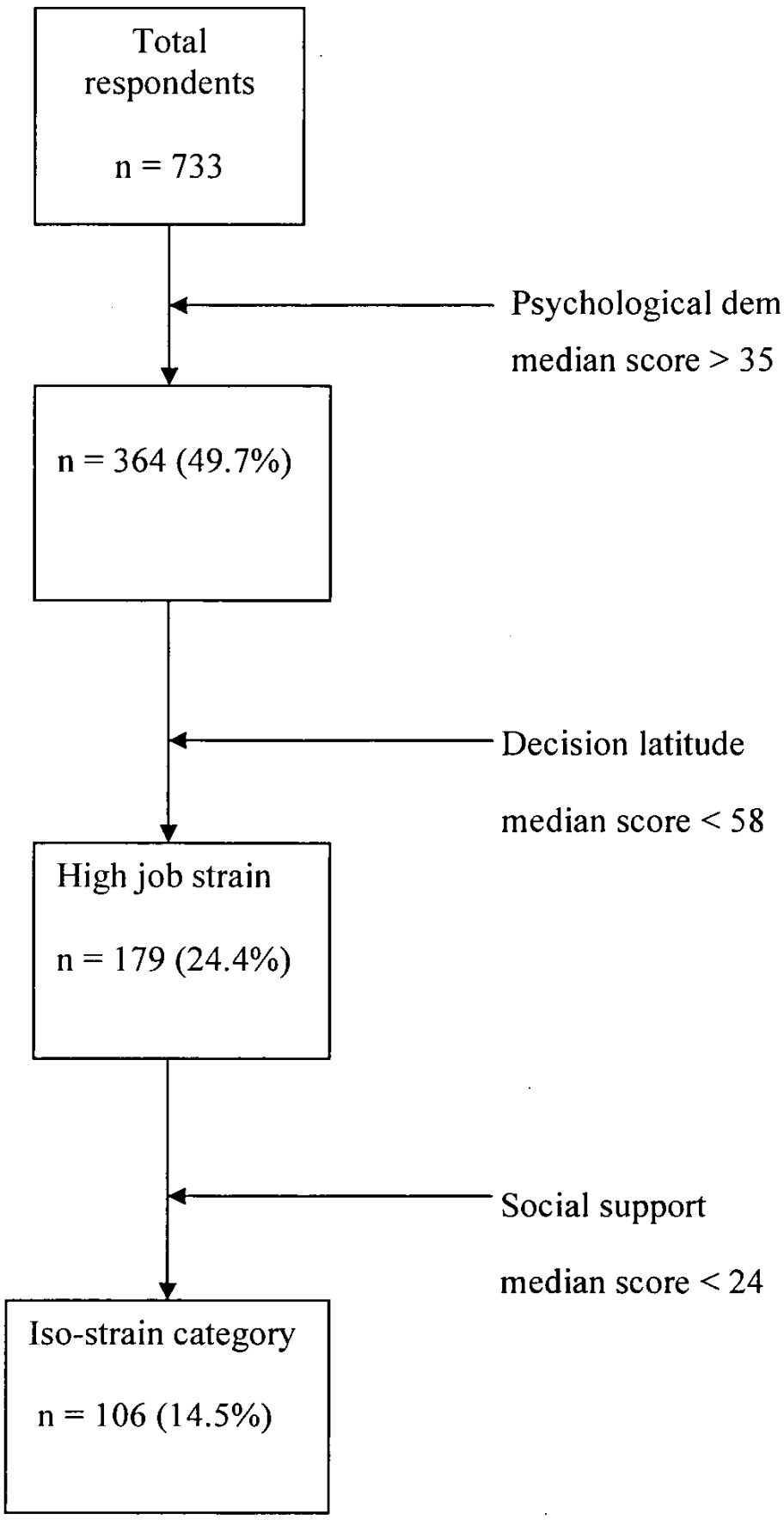


Table 4.8 Prevalence of high job strain and iso-strain among middle level managers and operational staff members

Status of occupational stress	Middle level managers n=353	Operational staff n=733	Significance
High job strain	63 (17.8%) (CI 15.1- 20.5)	179 (24.4%) (CI 21.5- 27.3)	Z = 2.45* p= 0.01
Iso-strain	36 (10.2%) (CI 8.1- 12.3)	106 (14.5%) (CI 12.1-16.9)	Z = 1.967* p = 0.049

**difference between two percentages was calculated to test for significance.*

The prevalence of high job strain in middle level managers and operational staff members was 17.8% (95%CI 15.1-20.5) and 24.4% (95%CI 21.5-27.3) respectively and the difference between these two percentages were found to be statistically significant (p = 0.01). The prevalence of iso-strain among middle level managers and operational staff members was 10.2 %(95%CI 8.1-12.3) and 14.5% (95%CI 12.1-16.9) respectively. The difference between the percentages of iso-strain among middle level managers and operational staff members too were found to be marginally significant (p=0.049).The present study showed that operational staff members perceived higher job strain as well as iso-strain than the middle level managers and that the differences were significant (p<0.05).

Table 4.9 shows the prevalences of iso-strain and high job strain among the study populations by sex.

Table 4.9 Prevalence of high job strain and iso-strain among middle level managers and operational staff members by sex

Status of occupational stress	Middle level managers N=353			Operational staff N=733		
	Male n=219	Female n=134	significance	Male n=344	Female n=389	significance
High job strain (%)	40 (18.3) (CI 15.6– 21.0)	23 (17.2) (CI 14.5-19.9)	Z=0.57* (p=0.569)	92 (26.7) (CI 23.7-29.7)	87 (22.4) (CI 19.6-25.2)	Z=2.05* (p=0.04)
Iso- strain (%)	23 (10.5) (CI 8.3-12.7)	13 (9.7) (CI 7.6-11.6)	Z= 0.52* (p=0.6)	53 (15.4) (CI13.0-17.8)	53 (13.6) (CI 11.3-15.9)	Z=1.04* (p=0.298)

**difference between two percentages was calculated to test for significance.*

A statistically significant difference was found only between the prevalence of high job strain among male and female operational staff members (p=0.04).

4.4 Correlates of occupational stress

The correlates of iso-strain and high job strain were assessed separately for middle level managers and operational staff members. The correlates of iso-strain and high job strain were assessed under the following major categories of socio-demographic and occupational characteristics, home work interface, factors intrinsic to the job, personal characteristics of the worker and career development.

4.4.1 Socio-demographic and occupational characteristics

a. Basic demographic characteristics -age, sex and ethnicity

b. Socio-economic characteristics -current marital service, highest educational qualifications, average monthly salary

c. Occupational characteristics -service in the currently working bank, service in the currently working branch, service in the present category of work, average hours of work per week and distance from the current place of residence to the work place

4.4.2 Home work interface

Time spent with the family, perceived anger due to work related problems at home, family problems affecting work and taking office work home

4.4.3 Factors intrinsic to the job

Perception of handling cash, face to face verbal abuse and hostility from customers, perception of working with customers, perceived delays in data processing and perception of the frequency of breakdown of computer systems in the bank

4.4.4 Personality of the worker

Perceived anxiety at work, perception of the frequency of anger while at work, perceived ability of coping work stress and perceived ability of coping family stress.

4.4.5 Career development

Perceived job security, perceived opportunities for promotions and perceived job satisfaction.

Prevalence odds ratios and their confidence intervals were calculated to quantify the effects of correlates. Each variable was stratified into two levels. Variables which were scored using a Likert scale were stratified into two levels by considering strongly disagree (1) and disagree (2) as one level while agree (3) and strongly agree (4) as the other level. The coding of variables is shown below each table as well as in Annex 12. The reference level (0) was taken as the category with no risk for iso-strain and high job strain and it was compared with the other level (1). Significant correlates are highlighted in bold.

4.4.6 Correlates of iso-strain and high job strain in middle level managers

4.4.6.1 Socio demographic and occupational characteristics

Table 4.10 shows the distribution of basic demographic correlates of iso-strain and high job strain in middle level managers.

Table 4.10 Distribution of iso-strain and high job strain by selected demographic characteristics in middle level managers

	Iso- strain (N=353)				High job strain (N=353)			
	YES n=36 (10.2%)		NO n=317 (89.8%)		YES n=63 (17.8%)		NO n=290 (82.2%)	
Ethnicity								
Sinhalese	31	86.1	284	89.6	53	84.1	262	90.3
Tamil	4	11.1	23	7.3	8	12.7	19	6.6
Moor	1	2.8	5	1.6	2	3.2	4	1.4
Burgher	0	0.00	3	0.9	0	0.0	3	1.0
Other	0	0.00	2	0.6	0	0.0	2	0.7
	Rows 2, 3, 4 and 5 were amalgamated for the calculation of χ^2 test. χ^2 = 0.41, df = 1, p = 0.52 OR = 1.4 (0.5-3.8)*				*Rows 2, 3, 4 and 5 were amalgamated for the calculation of χ^2 test.* χ^2 = 2.1, df = 1, p = 0.1 OR = 1.8 (0.8 – 3.9)*			
Age groups in completed years								
20-24	0	0.0	0	0.0	0	0.0	0	0.0
25-29	0	0.0	3	0.9	0	0.0	3	1.0
30-34	2	5.5	13	4.1	5	7.9	10	3.5
35-39	10	27.8	67	21.1	20	31.7	57	19.7
40-44	9	25.0	58	18.3	13	20.6	54	18.6
45-49	6	16.7	65	20.5	8	12.7	63	21.7
50-54	8	22.2	89	28.1	15	23.8	82	28.3
55-59	1	2.8	22	6.9	2	3.2	21	7.2
	Rows 1, 2 and 3 were amalgamated and 7&8 were amalgamated for the calculation of $\chi 2$ test. χ^2 = 2.6, df = 4, p=0.6 OR = 1.7 (0.6 – 4.8)**				*Rows 1, 2 and 3 were amalgamated for the calculation of $\chi 2$ test.* χ^2 = 8.6, df = 5, p=0.1 OR = 2 (1.2 – 3.5)**			
Sex								
Female	13	36.1	121	38.2	23	36.5	111	38.3
Male	23	63.9	196	61.8	40	63.5	179	61.7
	χ^2 = 0.06, df = 1, p = 0.81 OR = 1.1 (0.5-2.2)‡				χ^2 = 0.06, df = 1, p = 0.8 OR = 1.1 (0.6 – 1.9)‡			

* Ethnicity (Sinhalese - 0; Tamil, Muslim, Burgher, and others – 1)
** Age (≥35 - 0; <35 years – 1)
‡ Sex (Female – 0; Male – 1)

4.4.6.1.1 Age, sex and Ethnicity

There was no significant correlation between age, sex or ethnicity with the status of iso-strain or high job strain in middle level managers ($p>0.05$).

4.4.6.1.2 Socio-economic characteristics by iso- strain and high job strain in middle level managers

Table 4.11 shows the distribution of iso-strain and high job strain by selected socio-economic characteristics in middle level managers.

Table 4.11 Distribution of iso-strain and high job strain by selected socio-economic characteristics in middle level managers

	Iso- strain (N=353)				High job strain (N=353)			
	YES n=36 (10.2%)		NO n=317 (89.8%)		YES n=63 (17.8%)		NO n=290 (82.2%)	
Highest Level of education								
Passed GCE O/L	1	2.8	8	2.5	2	3.2	7	2.4
Passed GCE A/L	17	47.2	159	50.2	32	50.8	144	49.7
Diploma	9	25.0	80	25.2	16	25.4	73	25.2
Graduate	6	16.7	58	18.3	10	15.9	54	18.6
Post Graduate	3	8.3	12	3.8	3	4.8	12	4.1
	χ^2 = 1.68, df = 4, p = 0.79 OR = 1.1 (0.6-2.2)*				χ^2 = 0.4, df = 4, p = 0.98 OR =0.9 (0.5 – 1.6)*			
Marital status								
Unmarried	2	5.6	18	5.7	2	3.2	18	6.2
Married	31	86.1	292	92.1	58	92.1	265	91.4
Divorced/Separated	3	8.3	3	0.9	3	4.8	3	1.0
Widow	0	0.0	4	1.3	0	0.0	4	1.4
	Rows 3 and 4 were amalgamated for the calculation of the χ^2 *test.* χ^2 = 4.41, df = 2, p = 0.11 OR = 1.9 (0.7-5.3)**				*Rows 3 and 4 were amalgamated for the calculation of the* χ^2 *test.* χ^2 =0.03, df =1, p = 0.9 OR =0.9 (0.3 – 2.5)**			
Average monthly salary (Rs)								
30,000 – 50,000	13	36.1	165	52.1	24	38.1	154	53.1
> 50,000	23	63.9	152	47.9	39	61.9	136	46.9
	Rows 1 and 2 were amalgamated for the calculation of χ^2 *test.* χ^2 = 3.28, df = 1, p = 0.07 OR = 0.5 (0.3-1.1)‡				**χ^2 = 4.7, df = 1, p = 0.03** **OR =0.5 (0.3-0.9) ‡**			

* Highest level of education (Passed O/L, passed A/L – 0; diploma and above – 1)

** Marital status (Married – 0; unmarried, divorced/separated, widow – 1)

‡ Average monthly salary (>Rs 50 000 - 0; Rs 30 000 - Rs 50 000 – 1)

4.4.6.1.2.1 Level of education and marital status

The level of education or current marital status was not found to be statistically significant correlates of either iso-strain or high job strain among middle level managers (p>0.05).

4.4.6.1.2.2 Average monthly salary

Average monthly salary was not found to be a significant correlate of iso-strain in middle level managers (p>0.05) while it was a significant correlate of high job strain (p=0.03) among them. Middle level managers who were drawing an average monthly

salary of Rupees 50,000 or less were 0.5 times less likely to develop high job strain (OR=0.5; 95% CI 0.3-0.9).

4.4.6.1.3 Occupational characteristics and iso-strain and high job strain in middle level managers

Table 4.10 shows the distribution of iso-strain and high job strain by selected occupational characteristics in middle level managers. None of the occupational variables shown in Table 4.13 were found to be significantly correlated with iso-strain or high job strain among middle level mangers ($p>0.05$)

Table 4.12 Distribution of iso-strain and high job strain by selected occupational characteristics in middle level managers

	Iso- strain (N=353)				High job strain (N=353)			
	YES n=36 (10.2%)		NO n=317 (89.8%)		YES n=63 (17.8%)		NO n=290 (82.2%)	
Service in the bank working at present (Years)								
01-05	0	0.0	6	1.9	1	1.6	5	1.7
06-10	2	5.5	14	4.4	5	7.9	11	3.8
11-15	6	16.7	40	12.6	11	17.5	35	12.1
16-20	13	36.1	87	27.4	22	34.9	78	26.9
> 20	15	41.7	170	53.6	24	38.1	161	55.5
	Rows 1 and 2 were amalgamated for the calculation of χ^2 *test.* χ^2 = 2.24, df = 3, p = 0.523 OR = 0.9 (0.2 – 3.9)*				χ^2 =7.3, df = 4, p = 0.1 OR = 1.8 (0.7 –4.8)*			
Service in the branch working at present (Years)								
01-05	31	86.1	284	89.6	6	9.5	32	11.0
06-10	5	13.9	33	10.4	57	90.5	258	89.0
	χ^2 = 0.13, df = 1, p = 0.7 *With continuity correction* OR = 0.7 (0.3 – 1.9)**				χ^2 = 0.1, df = 1, p = 0.7 *With continuity correction* OR = 1.2 (0.5 – 2.9)**			
Experience in the present working category(Years)								
01-05	19	52.8	191	60.3	37	58.7	173	59.6
06-10	14	38.9	93	29.3	21	33.3	86	29.7
11-15	3	8.3	30	9.5	5	8.0	28	9.7
>15	0	0.0	3	0.9	0	0.0	3	1.0
	Rows 3 and 4 were amalgamated for the calculation of χ^2 *test.* χ^2 = 1.4, df = 2, p = 0.5, OR = 1.3 (0.4 – 4.4)‡				*Rows 3 and 4 were amalgamated for the calculation of* χ^2 *test.* χ^2 = 0.6, df = 2, p = 0.7 OR = 1.4 (0.5 – 3.7)‡			
Average working hours per week								
40-49	5	13.9	62	19.5	7	11.1	60	20.7
50-59	19	52.8	180	56.8	37	58.7	162	55.9
60-69	12	33.3	70	22.1	19	30.2	63	21.7
>69	0	0.0	5	1.6	0	0.0	5	1.7
	Rows 3 and 4 were amalgamated for the calculation of χ^2 *test.* χ^2 = 1.86, df = 2, p = 0.393 OR = 1.5 (0.6 – 4.1)‡‡				*Rows 3 and 4 were amalgamated for the calculation of* χ^2 test. χ^2 = 3.5, df = 2, p = 0.2 OR = 2.1 (0.9 – 4.8)‡‡			

	Iso- strain (N=353)				High job strain (N=353)			
	YES n=36 (10.2%)		NO n=317 (89.8%)		YES n=63 (17.8%)		NO n=290 (82.2%)	
Distance from current place of residence to the place of work(Km)								
01-10	21	58.3	133	42.0	33	52.4	122	42.0
11-20	15	41.7	140	44.2	24	38.1	131	45.3
21-30	0	0.0	31	9.8	4	6.3	27	9.3
31-40	0	0.0	6	1.9	1	1.6	5	1.7
41-50	0	0.0	3	0.9	0	0.0	3	1.0
51-60	0	0.0	1	0.3	1	1.6	0	0.0
>60	0	0.0	3	0.9	0	0.0	2	0.7
	Rows 2-7 were amalgamated for the calculation of χ^2 *test.* $\chi^2 = 3.46$, df = 1, p = 0.063 OR = 1.9 (0.9 -3.9) †				*Rows 3, 4, 5 and 6 were amalgamated for the calculation of* χ^2 *test.* $\chi^2 = 2.5$, df =3, p = 0.5 OR = 1.5 (0.9 – 2.7) †			

* Service in the current bank (≥11years - 0; 1-10 years -1)
** Service in the current branch (>5 years - 0; 1-5 years - 1)
‡ Service in the present category (≥11 years – 0; 1-10 years - 1)
‡‡ Average working hours (40-49 hours – 0; ≥50 hours - 1)
† Distance (1-10km – 0; >10km – 1)

4.4.6.2 Home work interface and the status of iso-strain and high job strain in middle level managers

Table 4.13 shows the distribution of home work interface variables by iso- strain and high job strain in middle level managers.

Table 4.13 Distribution of iso-strain and high job strain by home work interface characteristics in middle level managers

	Iso- strain (N=353)				High job strain (N=353)			
	YES n=36 (10.2%)		NO n=317 (89.8%)		YES n=63 (17.8%)		NO n=290 (82.2%)	
Perceived adequacy of time spent with the family								
Reduced	34	94.4	265	83.6	61	96.8	238	82.1
Not reduced	2	5.6	52	16.4	2	3.2	52	17.9
	χ^2 = 2.9, df = 1, p = 0.087 OR = 3.3 (0.8 – 14.3)*				**χ^2 = 8.7, df = 1, p = 0.003 OR = 6.7 (1.6 – 28.1) ***			
Perceived anger due to work related problems at home								
Yes	14	38.9	91	28.7	23	36.5	82	28.3
No	22	61.1	226	71.3	40	63.5	208	71.7
	χ^2 = 1.6, df = 1, p = 0.2 OR = 1.5 (0.8 – 3.2)**				χ^2 = 1.7, df = 1, p = 0.2 OR = 1.5 (0.8 – 2.6)**			
Perception of family problems affecting work								
Yes	14	38.9	58	18.3	18	28.6	54	18.6
No	22	61.1	259	81.7	45	71.4	236	81.4
	χ^2 = 8.4, df = 1, p = 0.004 OR = 2.8 (1.37 – 5.9)‡				χ^2 = 3.2, df = 1, p = 0.08 OR =1.7 (0.9 – 3.2)‡			
Taking office work home								
Yes	12	33.3	60	18.9	20	31.7	52	17.9
No	24	66.7	257	81.1	43	68.3	238	82.1
	χ^2 =4.1, df = 1, p = 0.04 OR = 2.1 (1.01 – 4.5)‡‡				**χ^2 =6.1, df = 1, p = 0.01 OR = 2.1 (1.2 – 3.9)‡‡**			

* Perceived adequacy of time spent with the family – (Not reduced – 0; Reduced – 1)
** Perceived anger due to work related problems at home – (No -0; Yes -1)
‡ Perception of family problems affecting work – (No -0; Yes -1)
‡‡Taking office work home- (No-0; Yes-1)

4.4.6.2.1 Perceived adequacy of time spent with family

Perceived adequacy of time spent with the family was not found to be a significant correlate of iso-strain among middle level managers (p=0.09) while it became a significant correlate of high job strain among them (p=0.003). The proportion of middle level managers with high job strain (96.8%, n=61) who perceived that the time spent with the family was reduced was significantly higher than those without iso-strain having the same perception (82.1%, n=238) with an OR of 6.7 (95% CI 1.6 – 28.1).

4.4.6.2.2 Perceived anger due to work related problems at home

Perceived anger due to work related problems at home was not found to be a significant correlate of iso-strain or high job strain in middle level managers (p<0.05).

4.4.6.2.3 Family problems affecting home

Family problems affecting work was found to be a significant correlate of iso-strain (p=0.004) while it was not significant for high job strain (p>0.05) among middle level managers. The proportion of middle level managers with iso-strain who had a perception of family problems affecting work (38.9%, n= 14) was significantly higher than those without iso-strain with the same perception (18.3%, n=58) with an OR of 2.8 (95% CI 1.37 – 5.88).

4.4.6.2.4 Taking office work home

Taking office work home was found to be a significant correlate of iso-strain (p=0.04) as well as high job strain (p=0.01) among middle level managers. The proportion of middle level managers with iso-strain (33.3%, n=12) who took office work home was higher than those without iso-strain who took office work home (18.7%, n=59), with an OR of 2.2 (95% CI 1.0 – 4.6). Similarly the proportion of middle level managers with high job strain who took office work home (31.7%, n=20) was significantly higher than those without high job strain who took office work home (17.9%, n=52) with an OR of 2.1 (95% CI 1.2 – 3.9).

4.4.6.3 Iso-strain and high job strain by personal characteristics of the middle level managers

Table 4.14 shows the distribution of iso-strain and high job strain by personal characteristics of middle level managers.

Table 4.14 Iso-strain and high job strain by the personal characteristics of middle level managers

	Iso- strain (N=353)				High job strain (N=353)			
	YES n=36 (10.2%)		**NO n=317 (89.8%)**		**YES n=63 (17.8%)**		**NO n=290 (82.2%)**	
Perceived anxiety at work								
Yes	11	30.6	54	17.0	19	30.2	46	15.9
No	25	69.4	263	83.0	44	69.8	244	84.1
	χ^2 = 3.9, df = 1, p = 0.047 OR = 2.1 (0.99 – 4.6)*				**χ^2 = 7, df = 1, p = 0.008 OR = 2.3 (1.2 – 4.3)***			
Frequent feeling of anger while at work								
Yes	9	25.0	36	11.4	11	17.5	34	11.7
No	27	75.0	281	88.6	52	82.5	256	88.3
	χ^2 = 5.4, df = 1, p = 0.02 OR = 2.6 (1.1 – 5.9) **				χ^2 = 1.5, df = 1, p = 0.2 OR = 1.6 (0.8 – 3.3) **			
Perceived ability of coping work stress								
Not satisfactory	12	33.3	53	16.7	19	30.2	46	15.9
Satisfactory	24	66.7	264	83.3	44	69.8	244	84.1
	χ^2 = 5.96, df = 1, p = 0.015 OR = 2.5 (1.2 – 5.3)‡				**χ^2 = 7.0 df = 1, p = 0.008 OR = 2.3 (1.2 – 4.3)‡**			
Perceived ability of coping family stress								
Not satisfactory	9	25.0	58	18.3	15	23.8	52	17.9
Satisfactory	27	75.0	259	81.7	48	76.2	238	82.1
	χ^2 = 0.9 df = 1, p = 0.3 OR = 1.5 (0.7 – 3.3)‡‡				χ^2 = 1.2, df = 1, p = 0.3 OR = 1.4 (0.7 – 2.7)‡‡			

* Perceived anxiety at work – (No- 0; Yes- 1)
** Becoming angry while at work – (No – 0; Yes – 1)
‡ Perceived ability to cope work stress – (Satisfactory – 0; Not satisfactory – 1)
‡‡ Perceived ability to cope family stress- (Satisfactory – 0; Not satisfactory – 1)

4.4.6.3.1 Perceived anxiety at work

Perceived anxiety at work was found to be a marginally significant correlate of iso-strain (p=0.047) while it was found to be a significant correlate of high job strain (p=0.008) among middle level managers. The proportion of middle level managers with high job strain (30.2%, n=19) who had a perception of anxiety while at work was significantly higher than those without high job strain who felt anxious while at work (15.9%, n=46) with an OR of 2.3 (95% CI 1.2 – 4.3).

4.4.6.3.2 Frequent feeling of anger while at work

Frequent feeling of anger while at work was a significant correlate of iso-strain among middle level managers (p=0.02) while it was not a significant correlate of high job strain (p>0.05). The proportion of middle level managers with iso-strain, who were frequently feeling angry while at work (30.2%, n=19) was significantly higher than those without iso-strain but frequently feeling angry while at work, with an OR of 2.6 (95% CI 1.1- 5.9).

4.4.6.3.3 Perceived ability to cope work stress

Perceived ability to cope work stress was significantly correlated with iso-strain (p=0.015) as well as high job strain (p=0.008) among middle level managers in the present study. A higher proportion of middle level managers with iso-strain (33.3%, n=12) perceived that their ability to cope up work stress was not satisfactory, compared to those without iso-strain with the same perception (16.7%, n=53) with an OR of 2.5 (95% CI 1.2-5.3). The proportion of middle level managers with high job strain who perceived that their ability to cope up work stress was not satisfactory (30.2%, n=19) was significantly higher than those without high job strain but still who thought their ability to cope up work stress was not satisfactory (15.9%, n=46) with an OR of 2.3 (95% CI 1.2-4.3).

4.4.6.3.4 Perceived ability to cope family stress

It was also observed that ability of coping family stress was not a significant correlate of iso-strain or high job strain among middle level managers (p>0.05).

4.4.6.4 Iso-strain and high job strain by factors intrinsic to the job among middle level managers

Table 4.15 shows the distribution of iso-strain and high job strain by factors intrinsic to the job among middle level managers.

Table 4.15 Distribution of iso- strain and high job strain by the factors intrinsic to the job among middle level managers

	Iso- strain (N=353)				High job strain (N=353)			
	YES n=36 (10.2%)		NO n=317 (89.8%)		YES n=63 (17.8%)		NO n=290 (82.2%)	
Perception of handling cash								
Stressful	10	27.8	84	26.5	17	27.0	77	26.6
Not stressful	26	72.2	233	73.5	46	73.0	213	73.4
	χ^2 = 0.027, df = 1, p = 0.87 OR = 1.1 (0.5 – 2.3)*				χ^2 = 0.005, df = 1, p = 0.9 OR = 1.0 (0.6 – 1.9)*			
Verbal abuse and hostility from customers								
Frequently	5	13.9	18	5.7	7	11.1	16	5.5
Not frequently	31	86.1	299	94.3	56	88.9	274	94.5
	χ^2 = 3.58, df = 1, p = 0.059 OR = 2.7 (0.9 – 7.7)**				χ^2 = 2.7, df = 1, p = 0.1 OR = 2.1 (0.8 – 5.4)**			
Perception of working with customers								
Stressful	13	36.1	56	17.7	20	31.7	49	16.9
Not Stressful	23	63.9	261	82.3	43	68.3	241	83.1
	χ^2 = 6.99, df = 1, p = 0.008 OR = 2.6 (1.3 – 5.5)‡				**χ^2 = 7.3, df = 1, p = 0.007 OR = 2.3 (1.2 – 4.2)‡**			
Perceived delays in data processing								
Yes	14	38.9	94	29.7	25	39.7	83	28.6
No	22	61.1	223	70.3	38	60.3	207	71.4
	χ^2 = 1.29, df = 1, p = 0.254 OR = 1.5 (0.7 – 3.1)‡‡				χ^2 = 2.9, df = 1, p = 0.08 OR = 1.6 (0.9 – 2.9)‡‡			
Perception of frequency of breakdown of computer systems in the bank								
Frequent	7	19.4	61	19.2	49	77.8	236	81.4
Not frequent	29	80.6	256	80.8	14	22.2	54	18.6
	χ^2 = 0.001, df = 1, p = 0.97 OR = 1.0 (0.4 – 2.4))†				χ^2 = 0.4, df = 1, p = 0.5 OR = 1.2 (0.6 – 2.4))†			

* Perception of handling cash – (Not stressful – 0; Stressful – 1)
** Abuse and hostility from customers – (Not frequently – 0; Frequently – 1)
‡ Perception of working with customers – (Not stressful - 0; Stressful – 1)
‡‡ Perceived delays in data processing- (No – 0; Yes – 1)
† Perceived frequency of computer breakdown – (Not frequently – 0; Frequently -1)

4.4.6.4.1 Perception of handling cash or verbal abuse and hostility from customers

Perception of handling cash or verbal abuse and hostility from customers were not found to be significant correlates of iso-strain or high job strain among middle level managers in the present study ($p>0.05$).

4.4.6.4.2 Perception of working with customers

Perception of working with customers was found to be a significant correlate of iso-strain ($p=0.008$) and high job strain ($p=0.007$) among middle level managers. The proportion of middle level managers with iso-strain who perceived that working with customers was stressful (36.1%, n=13) was significantly higher than those without iso-

strain with the same perception (17.7%, n=56) with an OR of 2.6 (95% CI 1.3-5.5). It was also seen that the proportion of middle level managers with high job strain who perceived that working with customers was stressful (31.7%, n=20) was significantly higher than those without high job strain with the same perception (16.9%, n=49) with an OR of 2.3 (95% CI 1.2-4.2).

4.4.6.4.3 Perceived delays in data processing and perception of the frequency of breakdown of computers in the bank

Perceived delays in data processing and perception of the frequency of breakdown of computers in the bank were not found to be significant correlates of iso-strain or high job strain among middle level managers ($p>0.05$).

4.4.6.5 Iso-strain and high job strain by career development among middle level managers

Distribution of iso-strain and high job strain by the correlates related to career development among middle level managers is shown in Table 4.16 below.

Table 4.16 Iso-strain and high job strain by career development among middle level managers

	Iso- strain (N=353)				**High job strain (N=353)**			
	YES n=36 (10.2%)		**NO n=317 (89.8%)**		**YES n=63 (17.8%)**		**NO n=290 (82.2%)**	
Perceived job security								
Not satisfactory	5	13.9	30	9.5	9	14.3	26	9.0
Satisfactory	31	86.1	287	90.5	54	85.7	264	91.0
	$\chi^2 = 0.7$, df = 1, p = 0.4 OR = 1.5 (0.6 – 4.3)*				$\chi^2 = 1.6$, df = 1, p = 0.2 OR = 1.7 (0.8 – 3.8)*			
Perceived opportunity for promotions								
Not satisfactory	21	58.3	117	36.9	31	49.2	106	36.6
Satisfactory	15	41.7	200	63.1	32	50.8	184	63.4
	$\chi^2 = 6.2$, df = 1, p = 0.01 OR = 2.4 (1.19 – 4.8)**				**$\chi^2 = 4.4$, df = 1, p = 0.04 OR = 1.8 (1.03 – 3.1)****			
Perceived job satisfaction								
Not satisfactory	24	66.7	72	22.7	31	49.2	65	22.4
Satisfactory	12	33.3	245	77.3	32	50.8	225	77.6
	$\chi^2 = 31.54$, df = 1, p< 0.001 OR = 6.8 (3.2 – 14.3)‡				**$\chi^2 = 18.8$, df = 1, p = 0.001 OR = 3.4 (1.9 – 5.9)‡**			

* Perceived job security – (Satisfactory - 0; Not satisfactory- 1)
** Perceived opportunities for promotions – (Satisfactory – 0; Not satisfactory – 1)
‡ Perceived job satisfaction – (Satisfactory - 0; Not satisfactory – 1)

4.4.6.5.1 Perceived job security

Perceived job security was not significantly correlated with iso-strain or high job strain among middle level managers ($p>0.05$) in this study.

4.4.6.5.2 Perceived opportunity for promotions

Perceived opportunity for promotions was found to be significantly correlated with iso-strain (p=0.01) as well as high job strain (p=0.04) among middle level managers in the present study. The proportion of middle level managers with iso-strain who perceived that there was lack of opportunity for promotions (58.3%, n=21) was significantly higher than those without iso-strain with the same perception (36.9%, n=117) with an OR of 2.4 (95% CI 1.19-4.8). In addition, the proportion of middle level managers with high job strain who perceived that there was lack of opportunity for promotions (49.2%, n=31) was significantly higher than those without high job strain with the same perception (36.6%, n=106) with an OR of 1.8 (95% CI 1.03 – 3.1).

4.4.6.5.3 Perceived job satisfaction

The proportion of middle level managers with iso-strain who had perceived job dissatisfaction (66.7%, n=24) was significantly higher than those without iso-strain having job dissatisfaction (22.7%, n=72) with an OR of 6.8 (95% CI 3.2-14.28). It was also observed that the proportion of middle level managers with high job strain who had perceived job dissatisfaction (49.2%, n=31) was significantly higher than those without high job strain having job dissatisfaction (22.4%, n=65) with an OR of 3.4 (95% CI 1.9-5.9). Perceived job satisfaction was significantly correlated with iso-strain (p<0.001) as well as high job strain (p=0.001) in the present study.

4.4.7 Correlates of iso-strain and high job strain among operational staff members

4.4.7.1 Socio-demographic and occupational characteristics

4.4.7.1.1 Basic demographic characteristics

Table 4.17 shows the distribution of basic demographic correlates of iso-strain and high job strain among operational staff members.

Table 4.17 Distribution of iso-strain and high job strain by selected demographic characteristics among operational staff members

	Iso- strain (N=733)				High job strain (N=733)			
	YES n=106 (14.5%)		NO n=627 (85.5%)		YES n=179 (24.4%)		NO n=554 (75.6%)	
Ethnicity								
Sinhalese	103	97.2	584	93.2	172	96.1	515	92.9
Tamil	01	0.9	24	3.8	2	1.1	23	4.2
Moor	02	1.9	14	2.2	4	2.2	12	2.2
Burgher	0	0.00	4	0.6	1	0.6	3	0.5
Other	0	0.00	1	0.2	0	0.0	1	0.2
	Rows 2, 3, 4 and 5 were amalgamated for the calculation of χ^2 test. χ^2 = 2.5, df = 1, p = 0.11 OR = 0.4 (0.1 – 1.3)*				*Rows 2, 3, 4 and 5 were amalgamated for the calculation of χ^2 test.* χ^2 = 2.3, df = 1, p = 0.13 OR = 0.5 (0.2 – 1.2)*			
Age groups in completed years								
20-24	25	23.6	162	25.8	48	26.8	139	25.1
25-29	35	33.0	147	23.5	56	31.3	126	22.7
30-34	25	23.6	113	18.0	39	21.8	99	17.9
35-39	16	15.1	90	14.4	23	12.8	83	15.0
40-44	2	1.9	31	4.9	5	2.8	28	5.1
45-49	1	0.9	26	4.2	3	1.7	24	4.3
50-54	2	1.9	49	7.8	4	2.2	47	8.5
55-59	0	0.0	9	1.4	1	0.6	8	1.4
	Rows 5, 6, 7 and 8 were amalgamated for the calculation of χ^2 test. **χ^2 =15.33, df = 4, p = 0.004 OR = 2.1 (1.2 -3.6) ****				*Rows 5, 6, 7 and 8 were amalgamated for the calculation of χ^2 test.* **χ^2 =17.7, df = 4, p = 0.001 OR = 2.2 (1.4 -3.5) ****			
Sex								
Female	53	50.0	336	53.6	87	48.6	302	54.5
Male	53	50.0	291	46.4	92	51.4	252	45.5
	χ^2 = 0.47, df = 1, p = 0.49 OR = 1.2 (0.8 – 1.7) ‡				χ^2 = 1.9, df = 1, p = 0.2 OR = 1.3 (0.9 – 1.8) ‡			

* Ethnicity (Sinhalese - 0; Tamil, Muslim, Burgher, and others – 1)

** Age (≥35 years - 0; <35 years – 1)

‡ Sex (Female – 0; Male – 1)

4.4.7.1.1.1 Ethnicity

Ethnicity was not found to be a significant correlate of iso-strain or high job strain in operational staff members in the present study (p>0.05).

4.4.7.1.1.2 Age

Age was significantly associated with iso-strain (p=0.004) and high job strain (p=0.001) in operational staff members. The proportion of operational staff members with iso-strain who were below 35 years (80.2%, n=85) was significantly higher than those operational staff members who were below 35 years without iso-strain (67.3%, n=422) with an OR of 2.1 (95% CI 1.2 -3.6). In addition, the proportion of operational staff members with high job strain who were below 35 years of age (79.9%, n=143) was significantly higher than those operational staff members who were below 35 years without high job strain (65.7%, n=364) with an OR of 2.2 (95% CI 1.4-3.5).

4.4.7.1.1.3 Sex

Sex was not significantly correlated with either iso-strain or high job strain among operational staff members in the present study ($p>0.05$).

4.4.7.1.2 Socio-economic characteristics by iso-strain and high job strain among operational staff members

Table 4.18 shows the distribution of iso-strain and high job strain by selected socio-economic characteristics among operational staff members.

Table 4.18 Distribution of iso-strain and high job strain by selected socio-economic characteristics of operational staff members

	Iso- strain (N=733)				High job strain (N=733)			
	YES n=106 (14.5%)		NO n=627 (85.5%)		YES n=179 (24.4%)		NO n=554 (75.6%)	
Highest Level of education								
Passed GCE O/L	2	1.9	15	2.4	2	1.1	15	2.7
Passed GCE A/L	79	74.5	463	73.9	130	72.6	412	74.4
Diploma	20	18.9	101	16.1	34	19.0	87	15.7
Graduate	4	3.8	44	7.0	12	6.7	36	6.5
Post Graduate	1	0.9	4	0.6	1	0.6	4	0.7
	Rows 4 and 5 were amalgamated for the calculation of the χ^2 test. χ^2 = 1.6, df = 3, p = 0.66 OR = 0.9 (0.6 – 1.6) *				*Row 1 and 2 were amalgamated and rows 4 and 5 were amalgamated for the calculation of the χ^2 test.* χ^2 = 1.1, df = 2, p = 0.6 OR = 1.2 (0.8 – 1.8) *			
Marital status								
Unmarried	48	45.4	258	41.1	90	50.2	216	39.0
Married	56	52.8	363	57.9	87	48.6	332	59.9
Divorced/Separated	1	0.9	5	0.8	1	0.6	5	0.9
Widow	1	0.9	1	0.2	1	0.6	1	0.2
	Rows 3 and 4 were amalgamated for the calculation of the χ^2 test. χ^2 = 1.49, df = 2, p = 0.47 OR = 1.2 (0.8 – 1.9) **				***Rows 3 and 4 were amalgamated for the calculation of the χ2 test.*** **χ^2 = 7.2, df = 2, p = 0.03 OR = 1.6 (1.1 – 2.2) ** **			
Average monthly salary (Rs)								
10,000 – 29,999	54	50.9	317	50.6	98	54.7	273	49.3
30,000 – 50,000	50	47.2	289	46.1	78	43.6	261	47.1
> 50,000	2	1.9	21	3.3	3	1.7	20	3.6
	χ^2 = 0.6, df = 2, p = 0.7 OR = 1.0 (0.7 – 1.5) ‡				χ^2 = 2.8, df = 2, p = 0.25 OR = 1.2 (0.9 – 1.7) ‡			

* Highest level of education (Passed O/L, passed A/L – 0; diploma and above – 1)

** Marital status (Married – 0; unmarried, divorced/separated, widow – 1)

‡ Average monthly salary (>Rs 50 000 - 0; Rs 30 000 – Rs 50 000 – 1)

4.4.7.1.2.1 Level of education

A significant correlation could not be found between the highest level of education and the status of iso-strain or high job strain among operational staff members ($p>0.05$).

4.4.7.1.2.2 Marital status

The marital status was not a significant correlate of iso-strain in operational staff members ($p=0.47$) but it was a significant correlate of high job strain among them ($p=0.03$). The proportion of operational staff members with high job strain who were unmarried, divorced or separated (51.4%, n=92) was significantly higher than those without high job strain with a similar marital status (40.1%, n=222) with an OR of 1.6 (95% CI 1.1-2.2).

4.4.7.1.2.3 Average monthly salary

The average monthly salary was not significantly correlated with either iso-strain or high job strain among operational staff members ($p>0.05$).

4.4.7.1.3 Occupational characteristics by iso-strain and high job strain among operational staff members

The distribution of iso-strain and high job strain by selected occupational characteristics in operational staff members is shown in Table 4.19.

Table 4.19 Distribution of iso-strain and high job strain by selected occupational characteristics in operational staff members

	Iso- strain (N=733)				High job strain (N=733)			
	YES n=106 (14.5%)		NO n=627 (85.5%)		YES n=179 (24.4%)		NO n=554 (75.6%)	
Service in the bank working at present (Years)								
01-05	33	31.1	232	37.0	67	37.4	198	35.7
06-10	44	41.5	151	24.1	61	34.1	134	24.2
11-15	21	19.8	117	18.6	34	19.0	104	18.8
16-20	6	5.7	43	6.9	11	6.1	38	6.9
> 20	2	1.9	84	13.4	6	3.4	80	14.4
	Rows 4 and 5 were amalgamated for the calculation of the χ^2 test χ^2 = 19.22, df = 3, p < 0.001 OR = 1.69 (1.1 – 2.67) *				χ^2 = 19.4, df =4, p< 0.001 OR = 1.7 (1.2 – 2.4) *			
Service in the branch working at present (Years)								
01-05	94	88.7	578	92.2	162	90.5	510	92.1
06-10	12	11.3	49	7.8	17	9.5	44	7.9
	χ^2 = 1.46, df = 1, p = 0.23 OR = 0.7 (0.3 – 1.3) **				χ^2 = 0.4, df = 1, p = 0.5 OR =0.8 (0.5 – 1.5) **			
Service in the present working category(Years)								
01-05	33	31.1	234	37.3	68	38.0	199	35.9
06-10	44	41.5	150	23.9	60	33.5	134	24.2
11-15	21	19.8	118	18.8	35	19.6	104	18.8
>15	8	7.6	127	19.9	16	8.9	117	21.1
	χ^2 =19.3, df =3, p<0.001 OR = 1.68 (1.1 - 2.7) ‡				**χ^2 = 15.7, df =3, p<0.001 OR = 1.7 (1.2 - 2.4) ‡**			
Average working hours per week								
40-49	26	24.5	203	32.4	43	24.0	186	33.6
50-59	56	52.8	329	52.4	96	53.6	289	52.1
60-69	20	18.9	77	12.3	35	19.6	62	11.2
>69	4	3.8	18	2.9	5	2.8	17	3.1
	χ^2 = 5.00, df = 3, p = 0.17 OR = 1.5 (0.9 – 2.4) ‡‡				**χ^2 = 11.2, df = 3, p = 0.01 OR =1.6 (1.1–2.4) ‡‡**			
Distance from current place of residence to the place of work(Km)								
01-10	39	36.8	318	50.7	76	42.5	281	50.7
11-20	43	40.6	198	31.6	65	36.3	176	31.8
21-30	11	10.4	64	10.2	17	9.5	58	10.5
31-40	3	2.8	21	3.3	9	5.0	15	2.7
41-50	4	3.8	16	2.6	5	2.8	15	2.7
51-60	1	0.9	2	0.3	1	0.6	2	0.3
>60	5	4.7	8	1.3	6	3.3	7	1.3
	Rows6 and 7 were amalgamated for the calculation of the χ2 test. **χ^2 = 13.2, df = 5, p = 0.02 OR = 1.8 (1.16 – 2.7) †**				χ^2 = 8.6, df = 6, p = 0.2 OR = 1.4 (0.9 – 1.9) †			

* Service in the current bank (≥11years – 0; 1-10 years- 1)
** Service in the current branch (≥6 years – 0; 1-5 years – 1)
‡ Service in the present category (≥11 years – 0; 1-10 years – 1)
‡‡ Average working hours (40-49 hours – 0; ≥50 hours – 1)
† Distance (1-10km – 0; ≥11km – 1)

4.4.7.1.3.1 Service in the bank working at present

Service in the bank working at present showed a significant correlation with iso-strain (p<0.001) as well as high job strain (p<0.001) among operational staff members. The proportion of operational staff members with iso-strain who were having a service of ten years or less in the present bank (72.6%, n=77) was significantly higher than those without iso-strain having a similar service (61.1%, n=383) with an OR of 1.69 (95% CI 1.1-2.67). It was also observed, that the proportion of operational staff members with high job strain with a service of ten years or less in the bank working at present (71.5%,

n=128) was significantly higher than those without high job strain having similar service in the bank working at present (59.9%, n=332) with an OR of 1.7 (95% CI 1.2-2.4).

4.4.7.1.3.2 Service in the branch working at present

Service in the branch working at present was not a significant correlate of iso-strain or high job strain among operational staf members in the present study ($p>0.05$).

4.4.7.1.3.3 Service in the present working category

Service in the present working category was found to be a significant correlate of iso-strain ($p<0.001$) as well as high job strain ($p<0.001$) among operational staff members. As seen in Table 5.10 the proportion of operational staff members with iso-strain who have served for ten years or less as operational staff members (72.6%, n= 77) were significantly higher than those without iso-strain having the same service (61.2%, n=384) with an OR of 1.68 (95% CI 1.1-2.7). Similarly, the proportion of operational staff members with high job strain with a service of ten or less number of years as operational staff members (71.5%, n=128) was significantly higher than those without high job strain having the same service as operational staff members (60.1%, n=333) with an OR of 1.7 (95% CI 1.2-2.4). It can be seen that, less experienced operational staff members were at a higher risk of developing iso-strain as well as high job strain according to the present study.

4.4.7.1.3.4 Average working hours

Although, the average working hours did not show a significant correlation with iso-strain in operational staff members ($p>0.05$), it became a significant correlate of high job strain among them ($p=0.01$). The proportion of operational staff members with high job strain who worked for 50 hours or more per week (76%, n=136) was significantly higher than those without high job strain who worked for the same amount of time per week (66.5%, n=368) with an OR of 1.6 (95% CI 1.1–2.4).

4.4.7.1.3.5 Distance from the current place of residence to the place of work

The distance from the current place of residence to the place of work was significantly correlated with iso-strain in operational staff members ($p=0.02$) while it was not with high job strain ($p>0.05$). The proportion of operational staff members with iso-strain who had to travel more than ten kilometers to get to their present place of work (63.2%, n=67) was significantly higher than those without iso-strain with a similar traveling pattern (49.3%, n=309) with an OR of 1.8 (95% CI 1.16-2.7).

4.4.7.2 Home work interface by iso-strain and high job strain among operational staff members

Table 4.20 shows the distribution of home work interface variables by iso-strain and high job strain in operational staff members.

Table 4.20 Distribution of iso-strain and high job strain by home work interface characteristics in the operational staff members

	Iso- strain (N=733)				High job strain (N=733)			
	YES N=106 (14.5%)		NO n=627 (85.5%)		YES n=179 (24.4%)		NO n=554 (75.6%)	
Perceived adequacy of time spent with the family								
Reduced	102	96.2	571	91.1	173	96.6	500	90.3
Not reduced	4	3.8	56	8.9	6	3.4	54	9.7
	χ^2 = 3.2, df = 1, p = 0.07 OR = 2.5 (0.9 – 7.0) *				**χ^2 =7.4, df = 1, p = 0.007 OR =3.1 (1.3 – 7.4) ***			
Perceived anger due to work related problems at home								
Yes	60	56.6	191	30.5	94	52.5	157	28.3
No	46	43.4	436	69.5	85	47.5	397	71.7
	χ^2 = 27.5, df = 1, p < 0.001 OR = 2.98 (1.96 – 4.5) **				**χ^2 = 35.1, df = 1, p < 0.001 OR = 2.8 (1.9 – 3.6) ****			
Perception of family problems affecting work								
Yes	33	31.1	124	19.8	49	27.4	108	19.5
No	73	68.9	503	80.2	130	72.6	446	80.5
	χ^2 = 6.9, df = 1, p = 0.008 OR = 1.8 (1.2 – 2.9) ‡				**χ^2 = 4.9, df = 1, p = 0.03 OR = 1.6 (1.1 – 2.3) ‡**			
Taking office work home								
Yes	14	13.2	70	11.2	19	10.6	65	11.7
No	92	86.8	557	88.8	160	89.4	489	88.3
	χ^2 = 0.37, df = 1, p = 0.54 OR = 1.2 (0.7 – 2.2) ‡‡				χ^2 = 0.17, df = 1, p = 0.7 OR = 0.9 (0.5 – 1.5) ‡‡			

* Perceived adequacy of time spent with the family – (Not reduced – 0; Reduced – 1)
** Perceived anger due to work related problems at home – (No -0; Yes -1)
‡ Perception of family problems affecting work – (No -0; Yes -1)
‡‡Taking office work home - (No-0; Yes-1)

4.4.7.2.1 Perceived adequacy of the time spent with the family

Perceived adequacy of the time spent with the family was not found to be significantly correlated with iso-strain in operational staff members ($p>0.05$) while it showed a significant correlation with high job strain among them ($p=0.007$). The proportion of operational staff members with high job strain who had a perception of reduction of time spent with the family (96.6%, n=173) was significantly higher than those without but having the same perception (90.3%, n=500) with an OR of 3.1 (95% CI 1.3-7.4).

4.4.7.2.2 Perceived anger due to work related problems at home

Perceived anger due to work related problems at home was found to be a significant correlate of iso-strain ($p<0.001$) as well as high job strain ($p<0.001$) among operational staff members. The proportion of operational staff members with iso-strain who perceived that they became angry at home due to work related problems (56.6%, n=60) was significantly higher than those without iso-strain with the same perception (30.5%, n=191) with an OR of 2.98 (95% CI 1.96-4.5). Similarly, the proportion of operational staff members with high job strain who perceived that they became angry at home due to work related problems (52.5%, n=94) was significantly higher than those without

high job strain with the same perception (28.3%, n=157) with an OR of 2.8 (95% CI 1.9-3.6).

4.4.7.2.3 Perception of family problems affecting work

Perception of family problems affecting work showed significant correlations with iso-strain (p=0.008) as well as high job strain (p=0.03) among operational staff members in the present study. The proportion of operational staff members with iso-strain with a perception of family problems affecting work (31.1%, n=33) was significantly higher than those operational staff members without iso-strain having the same perception (19.8%, n=124) with an OR of 1.8 (95% CI 1.2-2.9). It was also observed that the proportion of operational staff members with high job strain with a perception of family problems affecting work (27.4%, n=49) was significantly higher than those operational staff members without high job strain with the same perception (19.5%, n=108) with an OR of 1.6 (95% CI 1.1-2.3).

4.4.7.2.4 Taking office work home

Taking office work home was not a significant correlate of iso-strain or high job strain among operational staff members (p>0.05) according to the present study.

4.4.7.3 Iso-strain and high job strain by personal characteristics of operational staff members

Table 4.21 shows iso-strain and high job strain by personal characteristics of operational staff members.

Table 4.21 Iso-strain and high job strain by personal characteristics of operational staff members

	Iso- strain (N=733)				High job strain (N=733)			
	YES n=106 (14.5%)		NO n=627 (85.5%)		YES n=179 (24.4%)		NO n=554 (75.6%)	
Perceived anxiety at work								
Yes	41	38.7	101	16.1	56	31.3	86	15.5
No	65	61.3	526	83.9	123	68.7	468	84.5
	χ^2 = 29.57, df = 1, p < 0.001 OR = 3.3 (2.1 – 5.1) *				**χ^2 = 21.5, df = 1, p < 0.001 OR = 2.5 (1.7 – 3.7) ***			
Frequent feeling of anger while at work								
Yes	35	33.0	107	17.1	49	27.4	93	16.8
No	71	67.0	520	82.9	130	72.6	461	83.2
	χ^2 = 14.77, df = 1, p < 0.001 OR = 2.4 (1.5 -3.8) **				**χ^2 = 9.7, df = 1, p = 0.002 OR = 1.9 (1.3 -2.8) ****			
Perceived ability of coping work stress								
Not satisfactory	74	69.8	193	30.8	104	58.1	163	29.4
Satisfactory	32	30.2	434	69.2	75	41.9	391	70.6
	χ^2 = 59.64, df = 1, p < 0.001 OR = 5.2 (3.3 – 8.1) ‡				**χ^2 = 48.0, df = 1, p < 0.001 OR = 3.3 (2.3 –4.7) ‡**			
Perceived ability of coping family stress								
Not satisfactory	37	34.9	116	18.5	51	28.5	102	18.4
Satisfactory	69	65.1	511	81.5	128	71.5	452	81.6
	χ^2 = 14.77, df = 1, p < 0.001 OR = 2.4 (1.5 – 3.7) ‡‡				**χ^2 = 8.3, df = 1, p = 0.004 OR = 1.8 (1.2 – 2.6) ‡‡**			

* Perceived anxiety at work – (No- 0; Yes- 1)
** Frequent feeling of anger while at work – (No – 0; Yes – 1)
‡ Perceived ability to cope work stress – (Satisfactory – 0; Not satisfactory – 1)
‡‡ Perceived ability to cope family stress- (Satisfactory – 0; Not satisfactory – 1)

4.4.7.3.1 Perceived anxiety at work

Perceived anxiety at work was found to be a significant correlate of iso-strain ($p<0.001$) and high job strain ($p<0.001$) among operational staff members. The proportion of operational staff members with iso-strain who had a perception of anxiety at work (38.7%, n=41) was significantly higher than those operational staff members without iso-strain with the same perception (16.1%, n=101) with an OR of 3.3 (95% CI 2.1-5.1). It could also be seen that the proportion of operational staff members with high job strain with a perception of anxiety at work (31.3%, n=56) was significantly higher than those operational staff members without high job strain having a similar perception (15.5%, n=86) with an OR of 2.5 (95% CI 1.7-3.7).

4.4.7.3.2 Frequent feeling of anger while at work

Frequent feeling of anger while at work was found to be a significant correlate of iso-

strain (p<0.001) and high job strain (p=0.002) among operational staff members. The proportion of operational staff members with iso-strain who were frequently feeling angry while at work (33%, n=35) was significantly higher than those without iso-strain with a similar perception (17.1%, n=107) with an OR of 2.4 (95% CI 1.5-3.8). It was also seen that the proportion of operational staff members with high job strain who frequently felt angry while at work (27.4%, n=49) was significantly higher than those without high job strain but having a similar perception (16.8%, n=93) with an OR of 1.9 (95% CI 1.3-2.8).

4.4.7.3.3 Perceived ability to cope work stress

Perceived ability to cope work stress variable was found to be a significant correlate of iso-strain (p< 0.001) as well as high job strain (p< 0.001) among operational staff members. The proportion of operational staff members with iso-strain with a perception of inability to cope work stress (69.8%, n=74) was significantly higher than those without iso-strain having the same perception (30.8%, n=193) with an OR of 5.2 (95% CI 3.3-8.1). It was also observed that the proportion of operational staff members with high job strain who perceived that they could not cope work stress well (58.1%, n=104) was significantly higher than those without high job strain having the same perception (29.4%, n=163) with an OR of 3.3 (95% CI 2.3-4.7).

4.4.7.3.4 Perceived ability of coping family stress

Perceived ability of coping family stress too was found to be a significant correlate of iso-strain (p<0.001) as well as high job strain (p=0.004) among operational staff members. It was observed that the proportion of operational staff members with iso-strain with a perception of inability of coping family stress (34.9%, n=37) was significantly higher than those without iso-strain having the same perception (18.5%, 116) with an OR of 2.4 (95% CI 1.5-3.7). Similarly the proportion of operational staff members with high job strain with a perception of inability of coping family stress (28.5%, n=51) was significantly higher than those without high job strain having the same perception (18.4%, n=102) with an OR of 1.8 (95% CI 1.2-2.6).

4.4.7.4 Iso-strain and high job strain by factors intrinsic to the job in operational staff members

Table 4.22 shows the distribution of iso-strain and high job strain by factors intrinsic to the job in operational staff members.

Table 4.22 Distribution of iso-strain and high job strain by factors intrinsic to the job in operational staff members

	Iso- strain (N=733)				High job strain (N=733)			
	YES n=106 (14.5%)		NO n=627 (85.5%)		YES n=179 (24.4%)		NO n=554 (75.6%)	
Perception of handling cash								
Stressful	50	47.2	209	33.3	81	45.3	178	32.1
Not stressful	56	52.8	418	66.7	98	54.7	376	67.9
	χ^2 = 7.59, df = 1, p = 0.006 OR = 1.79 (1.18 – 2.7) *				χ^2 = 10.2, df = 1, p < 0.001 OR = 1.7 (1.2 – 2.5) *			
Verbal abuse and hostility from customers								
Frequently	21	19.8	52	8.3	29	16.2	44	7.9
Not frequently	85	80.2	575	91.7	150	83.8	510	92.1
	χ^2 = 13.4, df = 1, p< 0.001 OR = 2.7 (1.6 – 4.7) **				χ^2 = 10.3, df = 1, p<= 0.001 OR = 2.2 (1.6 – 3.7) **			
Perception of working with customers								
Stressful	36	34.0	104	16.6	50	27.9	90	16.2
Not Stressful	70	66.0	523	83.4	129	72.1	464	83.8
	χ^2 = 17.7, df = 1, p <0.001 OR = 2.6 (1.6- 4.1) ‡				χ^2 = 11.9, df = 1, p< 0.001 OR = 1.9 (1.3- 2.9) ‡			
Perceived delays in data processing								
Yes	57	53.8	222	35.4	90	50.3	189	34.1
No	49	46.2	405	64.6	89	49.7	365	65.9
	χ^2 = 12.97, df = 1, p < 0.001 OR = 2.1 (1.4 -3.2) ‡‡				χ^2 = 14.9 , df = 1, p < 0.001 OR = 1.9 (1.4 -2.7) ‡‡			
Perception of frequency of breakdown of computer systems in the bank								
Frequent	47	44.3	208	33.2	76	42.5	179	32.3
Not frequent	59	55.7	419	66.8	103	57.5	375	67.7
	χ^2 = 4.98, df = 1, p = 0.03 OR = 1.6 (1.1 – 2.4) †				χ^2 = 6.1, df = 1, p = 0.01 OR = 1.5 (1.1 – 2.2) †			

* Perception of handling cash – (Not stressful – 0; Stressful – 1)

** Abuse and hostility from customers – (Not frequently – 0; Frequently – 1)

‡ Perception of working with customers – (Not stressful - 0; Stressful – 1)

‡‡ Perceived delays in data processing- (No – 0; Yes – 1)

† Perceived frequency of computer breakdown – (Not frequently – 0; Frequently -1)

4.4.7.4.1 Perception of handling cash

Perception of handling cash variable was found to be a significant correlate of iso-strain (p=0.006) as well as high job strain (p<0.001) among operational staff members. Handling cash was perceived to be stressful for operational staff members with iso-strain (47.2%, n=50) compared to those without iso-strain having the same perception (33.3%, n=209) with an OR of 1.79 (95% CI 1.18-2.7). The proportion of operational staff members with high job strain who perceived that handling cash was stressful (45.3%, n=81) was significantly higher than those without high job strain having the same perception (32.1%, n=178) with an OR of 1.7 (95% CI 1.2-2.5).

4.4.7.4.2 Verbal abuse and hostility from customers

Verbal abuse and hostility were found to be significant correlates of iso-strain ($p<0.001$) as well as high job strain ($p<0.001$) among operational staff members according to the present study. The proportion of operational staff members with iso-strain who had frequent face to face verbal abuse and hostility from customers (19.8%, n=21) was significantly higher than those without iso-strain who reported similar occurrences (8.3%, n=52) with an OR of 2.7 (95% CI 1.6-4.7). It could be similarly observed that the proportion of operational staff members with high job strain who had frequent face to face verbal abuse and hostility from customers (16.2%, n=29) was significantly higher than those without high job strain with similar occurrences (7.9%, n=44) with an OR of 2.2 (95% CI 1.6-3.7).

4.4.7.4.3 Perception of working with customers

Working with customers was reported as stressful by a significantly higher proportion of operational staff members with iso-strain (34%, n=36) compared to those who were without iso-strain having the same perception (16.6%, n=104) with an OR of 2.6 (95% CI 1.6-4.1) and it was significantly correlated with iso-strain among them ($p<0.001$). The proportion of operational staff members with high job strain who perceived that working with customers was stressful (27.9%, n=50) was significantly higher than those without high job strain having the same perception (16.2%, n=90) with an OR of 1.9 (95% CI 1.3-2.9) and it was found to be a significant correlate of high job strain among operational staff members as well ($p<0.001$).

4.4.7.4.4 Perceived delays in data processing

Perceived delays in data processing was found to be a significant correlate of iso-strain ($p<0.001$) as well as high job strain ($p<0.001$) among operational staff members. The proportion of operational staff members with iso-strain with a perception of delays in data processing (53.8%, n=57) was significantly higher than those without iso-strain having the same perception (35.4%, n=222) with an OR of 2.1(95% CI 1.4-3.2). Similarly the proportion of operational staff members with high job strain with a perception of delays in data processing (50.3%, n=90) was significantly higher than those without iso-strain having the same perception (34.1%, n=189) with an OR of 1.9 (95% CI 1.4-2.7).

4.4.7.4.5 Perceived frequency of breakdown of computer systems

Perceived frequency of breakdown of computer systems in the bank variable was significantly correlated with iso-strain ($p=0.03$) and high job strain ($p=0.01$) among operational staff members. The proportion of operational staff members with iso-strain who had a perception of frequent computer breakdowns in the bank (44.3%, n=47) was significantly higher than those without iso-strain having a similar perception (33.2%, n=208) with an OR of 1.6 (95% CI 1.1-2.4). The proportion of operational staff members with high job strain who had a perception of frequent computer breakdowns in the bank (42.5%, n=76) was significantly higher than those without high job strain having a similar perception (32.3%, n=179) with an OR of 1.5 (95% CI 1.1-2.2).

4.4.7.5 Iso-strain and high job strain by career development in operational staff

Distribution of iso-strain and high job strain by variables of career development among the operational staff members is shown in Table 4.23.

Table 4.23 Iso-strain and high job strain by career development in operational staff

	Iso- strain (N=733)				High job strain (N=733)			
	YES n=106 (14.5%)		NO n=627 (85.5%)		YES n=179 (24.4%)		NO n=554 (75.6%)	
Perceived job security								
Not satisfactory	44	41.5	92	14.7	61	34.1	75	13.5
Satisfactory	62	58.5	535	85.3	118	65.9	479	86.5
	χ^2 = 43.21 df = 1, p < 0.001 OR = 4.1 (2.6 – 6.4) *				**χ^2 = 37.8, df = 1, p < 0.001 OR = 3.3 (2.2 – 4.9) ***			
Perceived opportunity for promotions								
Not satisfactory	80	75.5	224	35.7	109	60.9	195	35.2
Satisfactory	26	24.5	403	64.3	70	39.1	359	64.8
	χ^2 = 59.01, df = 1, p < 0.001 OR = 5.5 (3.5 – 8.9) **				**χ^2 = 36.8 , df = 1, p < 0.001 OR = 2.9 (2.0 – 4.1) ****			
Perceived job satisfaction								
Not satisfactory	79	74.5	224	35.7	112	62.6	191	34.5
Satisfactory	27	25.5	403	64.3	67	37.4	363	65.5
	χ^2 = 56.29, df = 1, p < 0.001 OR = 5.3 (3.3 – 8.4) ‡				**χ^2 = 44.0, df = 1, p < 0.001 OR = 3.2 (2.2 – 4.5) ‡**			

* Perceived job security – (Satisfactory - 0; Not satisfactory- 1)
** Perceived opportunities for promotions – (Satisfactory - 0; Not satisfactory – 1)
‡ Perceived job satisfaction – (Satisfactory - 0; Not satisfactory – 1)

4.4.7.5.1 Perceived job security

Perceived job security was a significant correlate of iso-strain (p<0.001) as well as high job strain (p<0.001) among operational staff members. The proportion of operational staff members with iso-strain who had a perception of job insecurity (41.5%, n=44) was significantly higher than those without iso-strain having a similar perception (14.7%, n=92) with an OR of 4.1 (95% CI 2.6-6.4). Similarly, the proportion of operational staff members with high job strain who had a perception of job insecurity (34.1%, n=61) was significantly higher than those without high job strain having a similar perception (13.5%, n=75) with an OR of 3.3 (95% CI 2.2-4.9).

4.4.7.5.2 Perceived opportunity for promotions

Perceived opportunity for promotions was significantly correlated with iso-strain (p<0.001) as well as high job strain (p<0.001) among operational staff members. The proportion of operational staff members with iso-strain who had a perception of lack of opportunities for promotions (75.5%, n=80) was significantly higher than those without iso-strain having a similar perception (35.7%, n=224) with an OR of 5.5 (95% CI 3.5-8.9). Similarly, the proportion of operational staff members with high job strain who perceived that they had lack of opportunities for promotions (60.9%, n=109) was significantly higher than those without high job strain having a similar perception (35.2%, n=195) with an OR of 2.9 (95% CI 2.0-4.1).

4.4.7.5.3 Perceived job satisfaction

Perceived job satisfaction was found to be significant correlate of iso-strain ($p<0.001$) as well as high job strain ($p<0.001$) among operational staff members. The proportion of operational staff members with iso-strain who had a perception of lack of job satisfaction (74.5%, n=79) was significantly higher than those without iso-strain having a similar perception (35.7%, n=224) with an OR of 5.3 (95% CI 3.3-8.4). Similarly, the proportion of operational staff members with high job strain with a perception of job dissatisfaction (62.6%, n=112) was significantly higher than those without high job strain having a similar perception (34.5%, n=191) with an OR of 3.2 (95% CI 2.2-4.5).

4.4.8 The summary of the findings of the bivariate analysis in study populations

The summary of the findings of bivariate analysis in middle level managers is given in Table 4.24 and Table 4.25.

Table 4.24 Summary of correlates of iso-strain among middle level managers: bivariate analysis

Variable	χ^2	p value	OR	95% CI
Demographic characteristics				
1. Age -less than 35 years	2.6	0.6	1.7	0.6-4.8
2. Sex = male	0.06	0.81	1.1	0.5-2.2
3. Ethnicity -others	0.41	0.52	1.4	0.5-3.8
Socio economic characteristics				
4.Level of education- Diploma and above	1.68	0.79	1.1	0.6-2.2
5. Marital status – currently unmarried	4.41	0.11	1.9	0.7-5.3
6. Average monthly salary >Rs.30,000/=	3.28	0.07	0.5	0.3-1.1
Employment characteristics				
7. Service in the current bank ≤10 years	2.24	0.52	0.9	0.2-3.9
8. Service in the current branch ≤5 years	0.13	0.7	0.7	0.3-1.9
9. service in the present category ≤10 years	1.4	0.5	1.3	0.4-4.4
10. Average working hours per week ≥50 hours	1.86	0.39	1.5	0.6-4.1
11. Distance from current place of residence to the place of work >10 km	3.46	0.06	1.9	0.9-3.9
Home work interface variables				
12. Time spent with the family	2.9	0.087	3.3	0.8-14.3
13. Perceived anger due to work related problems at home	1.6	0.2	1.5	0.8-3.2
14. Family problems affecting work	**8.4**	**0.004**	**2.8**	**1.37-5.9**
15. Taking office work home	4.1	0.04	2.1	1.01-4.5
Personal characteristics of workers				
16. Perception of anxiety at work	3.9	0.047	2.1	0.99-4.6
17. Frequent feeling of anger while at work	**5.4**	**0.02**	**2.6**	**1.1-5.9**
18. Perceived inability of coping work stress	**5.96**	**0.015**	**2.5**	**1.2-5.3**
19. Perceived inability of coping family stress	0.9	0.3	1.5	0.7-3.3

Variable	χ^2	p value	OR	95% CI
Factors intrinsic to the work				
20. Perception of handling cash	0.03	0.87	1.1	0.5-2.3
21.Verbal abuse and hostility from customers	3.58	0.059	2.7	0.9-7.7
22.Perception of working with customers as stressful	**6.99**	**0.008**	**2.6**	**1.3-5.5**
23. Perceived delays in data processing	1.29	0.25	1.5	0.7-3.1
24.Perception of the frequency breakdown of computer systems in the bank	0.001	0.98	1.0	0.4-2.4
Career development				
25. Perceived job insecurity	0.7	0.4	1.5	0.6-4.3
26.Perception of lack of opportunity for promotions	**6.2**	**0.01**	**2.4**	**1.19-4.8**
27. Perceived job dissatisfaction	**31.54**	**<0.001**	**6.8**	**3.2-14.3**

Table 4.25 Summary of correlates of high job strain among middle level managers: bivariate analysis

Variable	χ^2	p value	OR	95% CI
Demographic characteristics				
1. Age -less than 35 years	8.6	0.1	2.0	1.2-3.5
2. Sex – male	0.06	0.8	1.1	0.6-1.9
3. Ethnicity -others	2.1	0.1	1.8	0.8-3.9
Socio economic characteristics				
4.Level of education- Diploma and above	0.4	0.98	0.9	0.5-1.6
5. Marital status – currently unmarried	0.03	0.9	0.9	0.3-2.5
6. Average monthly salary >Rs.30,000/=	**4.7**	**0.03**	**0.5**	**0.3-0.9**
Employment characteristics				
7. Service in the current bank ≤10 years	7.3	0.1	1.8	0.7-4.8
8. Service in the current branch≤5 years	0.1	0.7	1.2	0.5-2.9
9. Service in the present category ≤10 years	0.6	0.7	1.4	0.5-3.7
10. Average working hours per week ≥50 hours	3.5	0.2	2.1	0.9-4.8
11. Distance from current place of residence to the place of work >10 km	2.5	0.5	1.5	0.9-2.7
Home work interface				
12. Time spent with the family	**8.7**	**0.003**	**6.7**	**1.6-28.1**
13. Perceived anger due to work related problems at home	1.7	0.2	1.5	0.8-2.6
14. Family problems affecting work	3.2	0.08	1.7	0.9-3.2
15. Taking office work home	**6.1**	**0.01**	**2.1**	**1.2-3.9**
Personal characteristics of workers				
16. Perception of anxiety at work	**7.0**	**0.008**	**2.3**	**1.2-4.3**
17. Frequent feeling of anger while at work	1.5	0.2	1.6	0.8-3.3
18. Perceived inability of coping work stress	**7.0**	**0.008**	**2.3**	**1.2-4.3**
19. Perceived inability of coping family stress	1.2	0.3	1.4	0.7-2.7

Variable	χ^2	p value	OR	95% CI
Factors intrinsic to the work				
20. Perception of handling cash as stressful	0.005	0.9	1.0	0.6-1.9
21.Verbal abuse and hostility from customers	2.7	0.1	2.1	0.8-5.4
22.Perception of working with customers as stressful	**7.3**	**0.007**	**2.3**	**1.2-4.2**
23. Perceived delays in data processing	2.9	0.08	1.6	0.9-2.9
24.Perception of the frequency breakdown of computer systems in the bank	0.4	0.5	1.2	0.6-2.4
Career development				
25. Perceived job insecurity	1.6	0.2	1.7	0.8-3.8
26. Perception of lack of opportunity for promotions	**4.4**	**0.04**	**1.8**	**1.03-3.1**
27. Perceived job dissatisfaction	**18.8**	**0.001**	**3.4**	**1.9-5.9**

The summary of the findings of bivariate analysis in operational staff members is given in Table 4.26 and Table 4.27.

Table 4.26 Summary of correlates of iso-strain among operational staff members: bivariate analysis

Variable	χ^2	p value	OR	95% CI
Demographic characteristics				
1. Age -less than 35 years	**15.33**	**0.004**	**2.1**	**1.2-3.6**
2. Sex - male	0.469	0.49	1.2	0.8-1.7
3. Ethnicity -others	2.5	0.11	0.4	0.1-1.3
Socio economic characteristics				
4.Level of education- Diploma and above	1.6	0.66	0.9	0.6-1.6
5. Marital status – currently unmarried	1.49	0.47	1.2	0.8-1.9
6. Average monthly salary >Rs.30,000/=	0.6	0.7	1.0	0.7-1.5
Employment characteristics				
7. Service in the current bank ≤10 years	**19.22**	**<0.001**	**1.69**	**1.1-2.67**
8. Service in the current branch≤5 years	1.46	0.22	0.7	0.3-1.3
9. service in the present category ≤10 years	**19.3**	**<0.001**	**1.68**	**1.1-2.7**
10. Average working hours per week ≥50 hours	5.0	0.17	1.5	0.9-2.4
11. Distance from current place of residence to the place of work >10 km	**13.2**	**0.02**	**1.8**	**1.16-2.7**
Home work interface variables				
12. Time spent with the family	3.2	0.07	2.5	0.9-7.0
13. Perceived anger due to work related problems at home	**27.5**	**<0.001**	**2.98**	**1.96-4.5**
14. Family problems affecting work	**6.9**	**0.008**	**1.8**	**1.2-2.9**
15. Taking office work home	0.37	0.54	1.2	0.7-2.2

Variable	χ^2	p value	OR	95% CI
Personal characteristics of workers				
16. Perception of anxiety at work	**29.57**	**<0.001**	**3.3**	
17. Frequent feeling of anger while at work	**14.77**	**<0.001**	**2.4**	**1.5-3.8**
18. Perceived inability of coping work stress	**59.64**	**<0.001**	**5.2**	**3.3-8.1**
19. Perceived inability of coping family stress	**14.77**	**<0.001**	**2.4**	**1.5-3.7**
Factors intrinsic to the work				
20. Perception of handling cash as stressful	**7.59**	**0.006**	**1.79**	**1.18-2.7**
21.Verbal abuse and hostility from customers	**13.4**	**<0.001**	**2.7**	**1.56-4.7**
22.Perception of working with customers as stressful	**17.7**	**<0.001**	**2.6**	**1.6-4.1**
23. Perceived delays in data processing	**12.97**	**<0.001**	**2.1**	**1.4-3.2**
24.Perception of the frequency breakdown of computer systems in the bank	**4.98**	**0.03**	**1.6**	**1.1-2.4**
Career development				
25. Perceived job insecurity	**43.21**	**<0.001**	**4.1**	**2.6-6.4**
26.Perception of lack of opportunity for promotions	**59.01**	**<0.001**	**5.5**	**3.5-8.9**
27. Perceived job dissatisfaction	**56.29**	**<0.001**	**5.3**	**3.3-8.4**

Table 4.27 Summary of correlates of high job strain among operational staff members: bivariate analysis

Variable	χ^2	p value	OR	95% CI
Demographic characteristics				
1. Age -less than 35 years	**17.7**	**0.001**	**2.2**	**1.4-3.5**
2. Sex – male	1.9	0.2	1.3	0.9-1.8
3. Ethnicity -others	2.3	0.13	0.5	0.2-1.2
Socio economic characteristics				
4.Level of education- Diploma and above	1.1	0.6	1.2	0.8-1.8
5. Marital status – currently unmarried	**7.2**	**0.03**	**1.6**	**1.1-2.2**
6. Average monthly salary >Rs.30,000/=	2.8	0.25	1.2	0.9-1.7
Employment characteristics				
7. Service in the current bank ≤10 years	**19.4**	**0.001**	**1.7**	**1.2-2.4**
8. Service in the current branch ≤5 years	0.4	0.5	0.8	0.5-1.5
9. service in the present category ≤10 years	**15.7**	**0.001**	**1.7**	**1.2-2.4**
10. Average working hours per week ≥50 hours	**11.2**	**0.01**	**1.8**	**0.9-3.3**
11. Distance from current place of residence to the place of work >10 km	8.6	0.2	1.4	0.9-1.9
Home work interface variables				
12. Time spent with the family	**7.4**	**0.007**	**3.1**	**1.3-7.4**
13. Perceived anger due to work related problems at home	**35.1**	**<0.001**	**2.8**	**1.9-3.6**
14. Family problems affecting work	**4.9**	**0.03**	**1.6**	**1.1-2.3**
15. Taking office work home	0.17	0.7	0.9	0.5-1.5

Variable	χ^2	p value	OR	95% CI
Personal characteristics of the worker				
16. Perception of anxiety at work	**21..5**	**<0.001**	**2.5**	**1.7-3.7**
17. Frequent feeling of anger while at work	**9.7**	**0.002**	**1.9**	**1.3-2.8**
18. Perceived inability of coping work stress	**48.0**	**<0.001**	**3.3**	**2.3-4.7**
19. Perceived inability of coping family stress	**8.3**	**0.004**	**1.8**	**1.2-2.6**
Factors intrinsic to the work				
20. Perception of handling cash as stressful	**10.2**	**0.001**	**1.7**	**1.2-2.5**
21.Verbal abuse and hostility from customers	**10.3**	**0.001**	**2.2**	**1.6-3.7**
22.Perception of working with customers as stressful	**11.9**	**0.001**	**1.9**	**1.3-2.9**
23. Perceived delays in data processing	**14.9**	**<0.001**	**1.9**	**1.4-2.7**
24.Perception of the frequency breakdown of computer systems in the bank	**6.1**	**0.01**	**1.5**	**1.1-2.2**
Career development				
25. Perceived job insecurity	**37.8**	**<0.001**	**3.3**	**2.2-4.9**
26.Perception of lack of opportunity for promotions	**36.8**	**<0.001**	**2.9**	**2.0-4.1**
27. Perceived job dissatisfaction	**44.0**	**<0.001**	**3.2**	**2.2-4.5**

4.4.9 Multivariate analysis

4.4.9.1 Introduction

Logistic regression can be used to predict a dependent variable on the basis of continuous and/or categorical independents and to determine the percent of variance in the dependent variable explained by the independents; to rank the relative importance of independents; to assess interaction effects; and to understand the impact of covariate control variables. The impact of predictor variables is usually explained in terms of odds ratios.

Two statistical models were used to test the association of occurrence of iso-strain with its associated factors or correlates in middle level managers and operational staff members. All variables were included for the model. Dependent variable was measured as a binary variable and it was coded as cases = 1, non cases = 0. Variables were entered into the logistic model as categorical and binary variables. Binomial logistic regression by default predicts the higher of the two categories of the dependent (usually 1), using the lower (usually 0) as the reference category. Each independent variable was stratified into two levels. The first level of stratification was taken as the reference, which usually had the lower risk of iso-strain. It was compared with the other level which had the higher risk of having iso-strain (Annex 12). Forward stepwise method was used in entering the variables as a block to the model. Probability for stepwise forward regression was fixed for entry at 0.05 and removed at 0.1 significance level. Likelihood ratio was used to determine the variables that were retained in the model.

Table 4.28 Summary findings of the logistic regression model for middle level managers : iso-strain

Variable	B	S.E.	Wald	df	Sig.	Exp (B)	95% CI for EXP(B)	
							Lower	Upper
Taking office work home	1.1	0.424	6.87	1	0.009	3.1	1.3	6.98
Perceived job dissatisfaction	2.1	0.394	27.08	1	<0.001	7.76	3.59	16.77
Distance ≤10km from place of residence to the working place	0.83	0.386	4.6	1	0.03	2.3	1.1	4.9

Out of the variables selected for the model, only the variables given in Table 4.28 became significant correlates of iso-strain among middle level managers. Some of the correlates that were found to be significant in the bivariate analysis (Table 4.22) were not found to be significant correlates of iso-strain at 0.05 level of significance in the regression model.

Table 4.29 Summary findings of the logistic regression model for middle level managers: high job strain

Variable	B	S.E.	Wald	Df	Sig.	Exp (B)	95.0% CI for EXP(B)	
							Lower	Upper
Reduction in time spent with family	1.7	0.743	5.3	1	0.02	5.6	1.3	23.9
Taking office work home	0.9	0.3	6.7	1	0.01	2.3	1.2	4.5
Job dissatisfaction	1.2	0.29	16.1	1	<0.001	3.3	1.8	5.9

Of the variables selected for the model, reduction of time spent with the family ($p=0.02$), taking office work home ($p=0.01$) and job dissatisfaction ($p<0.001$) were identified as significant correlates of high job strain among middle level managers. It can be concluded that taking office work home and job dissatisfaction are significant correlates of iso-strain as well as high job strain among middle level managers ($p<0.05$).

Table 4.30 Summary findings of the logistic regression model for operational staff members: iso-strain

variable	B	S.E.	Wald	df	Sig.	Exp (B)	95% CI for EXP(B)	
							Lower	Upper
Perceived anger due to work related problems at home	.603	.243	6.17	1	.013	1.8	1.1	2.9
Perceived job insecurity	.997	.252	15.651	1	<0.001	2.7	1.65	4.4
Perceived lack of opportunities for promotions	1.247	.295	17.835	1	<0.001	3.5	1.95	6.2
Perceived job dissatisfaction	.639	.290	4.867	1	.027	1.89	1.1	3.3
Perceived inability of coping work stress	1.09	.253	18.85	1	<0.001	3.0	1.83	4.9
Service in the currently working bank ≤ 10yrs	.912	.267	11.69	1	.001	2.5	1.48	4.2

Adjusted correlates of iso-strain among operational staff members using the multivariate analysis are: perceived anger due to work related problems at home (p=0.013), perceived job insecurity (p<0.001), perceived lack of opportunities for promotions perceived (p<0.001), job dissatisfaction (p=0.027), perceived inability of coping work stress (p<0.001) and the service in the currently employed bank for ten years or less (0.001).

Table 4.31 Summary findings of the logistic regression model for operational staff members: high job strain

Variable	B	S.E.	Wald	Df	Sig.	Exp (B)	95.0% CI for EXP(B)	
							Lower	Upper
Perceived anger due to work related problems at home	0.6	0.2	9.6	1	0.002	1.8	1.2	2.7
Perceived job insecurity	0.696	0.2	10.0	1	0.002	2.0	1.3	3.1
Perceived lack of opportunities for promotions	0.62	0.2	7.6	1	0.006	1.9	1.2	2.9
Perceived job dissatisfaction	0.47	0.2	4.4	1	0.035	1.6	1.03	2.5
Perceived inability of coping work stress	0.715	0.19	12.9	1	<0.001	2.0	1.4	3.0
Perceived delays in data processing	0.4	0.2	3.9	1	0.049	1.5	1.002	2.1
Age - <35 years	0.7	0.3	6.8	1	0.009	1.9	1.2	3.3
Marital status – unmarried,divorced,seperated	0.4	0.2	3.9	1	0.048	1.5	1.003	2.3

It is seen from Table 4.31 that perceived anger due to work related problems at home, (p=0.002), perceived job insecurity (p=0.002), perceived lack of opportunities for promotions (p=0.006), perceived job dissatisfaction (p=0.035), perceived inability to cope work stress (p<0.001), perceived delays in data processing (p=0.049), age (0.009) and marital status (p=0.048) were found to be significant correlates of high job strain among operational staff members in the regression model.

Perceived anger due to work related problems at home, perceived job insecurity, perceived lack of opportunities for promotions, perceived job dissatisfaction and perceived inability to cope work stress have been found to be significant correlates of iso-strain as well as high job strain among operational staff members in the present study (p<0.05).

4.5 Component 3

All middle level managers selected for the study and the control groups fulfilled criteria of eligibility. Of 100 eligible middle level managers in the study group who belonged to 45 clusters, 92 (92 %) participated in the pre intervention assessment while only 89 (89 %) of them took part in the post intervention assessment. Similarly of 98 eligible middle level managers (45 clusters) who belonged to the control group, 90 (91.8%) participated in the pre intervention assessment, while only 88 (89.8%) took part in the post intervention assessment (Table 4.33). Only those participants who completed both pre and post intervention assessments from each group were taken into consideration in the analysis. The reason for non participation was that two managers in the study group were transferred from the branches to departments and one manager from the control group resigned and went abroad.

Table 4.32 Distribution of middle level managers who participated in the pre and post intervention assessments from each group

Group	No of eligible middle level managers	Pre-intervention		Post-intervention	
		No	%	No	%
Study	100	92	92	89	89
Control	98	90	91.8	88	89.8

4.5.1 Comparison of characteristics of the study and the control groups

A cluster randomized trial design was used in the present study. Hence it is necessary to assess the extent to which the study and the control groups are comparable in aspects that are likely to have an impact on the outcome of the intervention. In addition, the study and the control groups should be comparable in their baseline characteristics to assess the effectiveness of the intervention. The relevant characteristics for this study were compared and presented in the preceding sections.

4.5.1.1 Socio-demographic and occupational characteristics of the participants

The basic socio-demographic and occupational information of the participants of the study and the control groups that were considered to be important were compared.
The demographic, socio-economic and occupational characteristics of the study and the control groups are given in Tables 4.33-4.35.

4.5.1.1.1. Age

The middle level managers selected for this study had their age ranging from 27 years to 55 years. Majority in the study (64.1%, n=59) and in the control groups (64.4%, n=58) were in the age group of 36-45 years. The mean age of the study group was 42.2 years (SD = 5.5 years) while it was 40.9 years (SD = 5.9 years) for the control group. The mean age of the total group was 41.5 years (SD = 5.7 years). However there was no statistically significant difference in mean ages of the study and control groups ($p>0.05$).

4.5.1.1.2 Sex

It was observed that 54 (58.7%) of the middle level managers in the study group were males while it was 63 (70%) in the control group. The difference in the distribution of the two groups by sex was not statistically significant ($p>0.05$).

4.5.1.1.3 Ethnicity

Majority (81.5%, n=75) of the middle level managers in the study group and 79 (87.8%) of middle level managers in the control group were Sinhalese. The difference in the distribution of the two groups by ethnicity was not statistically significant ($p>0.05$).

It was observed that the study and the control groups were comparable in their demographic characteristics.

Table 4.33 Comparison of the study and control groups by demographic characteristics

Demographic characteristics	Study group n = 92		Control group n = 90		Significance
	No	%	No	%	
Age group					
26-35	10	10.9	14	15.6	$\chi^2 = 2.98$ df = 2, p = 0.31
36-45	59	64.1	58	64.4	
46-55	23	25.0	18	20.0	
Sex					
Male	54	58.7	63	70.0	$\chi^2 = 2.53$ df = 1, p = 0.11
Female	38	41.3	27	30.0	
Ethnicity					
Sinhalese	75	81.5	79	87.8	$\chi^2 = 3.99$ df = 4 p = 0.41
Tamil	13	14.1	6	6.7	
Moor	1	1.1	3	3.3	
Burgher	1	1.1	1	1.1	
Others	2	2.2	1	1.1	

4.5.1.1.4 Level of education

It can be seen from Table 4.32 that among the middle level managers of the study group, 38 (40.3%) had educational qualifications of diplomas, degrees, or post graduate qualifications level while it was 50 (55.6%) in the control group.

4.5.1.1.5 Marital status

Majority of the middle level managers were currently married in both the study (85.9%, n=79) and the control (91.1%, n=82) groups.

4.5.1.1.6 Monthly gross salary

It was observed that 78 (84.8%) of middle level managers in the study group received a gross monthly salary of more than Rs 50,000 while it was 81 (90%) in the control group.

A statistically significant difference between the middle level managers of the study and the control groups with respect to the level of education, civil status or gross monthly income was not observed. (P>0.05)

Table 4.34 Comparison of middle level managers in study and control groups by socio-economic characteristics

Socio-economic characteristics	Study group n = 92		Control group n = 90		Significance
	No	%	No	%	
Level of education					
A/L	54	58.7	40	44.4	$\chi^2 = 4.64$ df = 3 p = 0.2
Diploma	28	30.4	34	37.8	
Graduate	4	4.4	9	10.0	
Post graduate	6	6.5	7	7.8	
Civil status					
Unmarried	9	9.8	7	7.8	$\chi^2 = 2.08$ df = 2 p = 0.35
Married	79	85.9	82	91.1	
Divorced/Separated	4	4.3	1	1.1	
Monthly gross salary (Rs)					
30,000 – 50,000	14	15.2	9	10.0	$\chi^2 = 1.12$ df = 1, p = 0.29
> 50,000	78	84.8	81	90.0	

Table 4.35 shows the distribution of the middle level managers of the study and the control groups by occupational characteristics.

Table 4.35 Comparison of middle level managers in the study and control groups by occupational characteristics

Occupational characteristics	Study group n = 92		Control group n = 90		Significance
	No	%	No	%	
Service in the present bank in completed years					
1-10	6	6.5	7	7.8	χ^2 = 4.9 df = 3 p = 0.18
11-20	62	67.4	71	78.9	
21-30	23	25.0	11	12.2	
31-40	1	1.1	1	1.1	
Service in the present branch in completed years					
0-5	89	96.7	86	95.6	χ^2 = 0.17 df = 1, p = 0.68
6-10	3	3.3	4	4.4	
Service as a middle level manager in completed years					
1-5	45	48.9	54	60.0	χ^2 = 3.5 df = 2 p = 0.17
6-10	43	46.7	30	33.3	
11-15	4	4.4	6	6.7	
Average hours of work per week					
40-49	7	7.6	14	15.6	χ^2 = 4.22 df = 1 p = 0.24
50-59	65	70.7	54	60.0	
60-69	14	15.2	18	20.0	
>70	6	6.5	4	4.4	
Distance to the work place of current place from residence (Km)					
1-30	89	96.7	87	96.7	χ^2 = 0.001 df = 1, p = 0.98
>30	3	3.3	3	3.3	

4.5.1.1.7 Service in the present bank

The number of years of service in the bank ranged from 4 to 31 years for the study group and from 5-32 years for the control group with a mean value of 18.14 years (SD=5.38) years and 17.34 years (SD=4.96) years respectively. It was 17.75 years (SD=5.18) years for the total group. There was no significant difference between the study and the control groups with regard to the mean number of years in service in the bank ($p>0.05$).

4.5.1.1.8 Service in the present branch

It was observed that 89 (96.7%) of the middle level managers in the study group and 86 (95.6%) of middle level managers in the control group had served for 5 years or less in the currently working branch. The mean service in the branch of the study group was 2.4 years (SD=1.4 years) while it was 2.5 years (SD= 1.4 years) for the control group. A statistically significant difference was not found between the mean number of years served in the present branch in the study and control groups ($p>0.05$).

4.5.1.1.9 Service as a middle level manager

The number of years in service as a middle level manager ranged from 2-15 years for the study group and from 2-12 years for the control group with a mean value of 5.72 years (SD=2.98) years and 5.72 years (SD=3.00) years for the study and control groups respectively. A significant difference between the mean number of years in service in the present branch of the study and control groups were not observed ($p > 0.05$).

4.5.1.1.10 Average hours of work

The mean hours of work per week was 54.46 hours (SD=6.35) hours for the study group and 53.28 hours (SD=7.19) hours for the control group. There was no significant difference between the mean hours of work in the study and control groups ($p>0.05$).

4.5.1.1.11 Distance to the work place of current place from residence

Table 4.36 shows that 89 (96.7%) of the middle level managers in the study group and 87 (96.7%) of the middle level managers in the control group travel less than 30 km a day to come to their work place. The difference between the two groups was not statistically significant ($p>0.05$).

It can be concluded that the study and the control groups were comparable in demographic, socio- economic and occupational characteristics.

4.5.2 Pre- intervention assessment

The pre-intervention assessment was carried out in the study and control groups concurrently and it was designed to assess the iso-strain and psychological distress. Psychological distress was assessed using the GHQ-30 and iso-strain was assessed using the three selected scales of the JCQ which was validated in component 1 of the present study. The results of the pre-intervention assessment in the study and the control groups are given below in Tables 4.36 to 4.37.

Table 4.36 Comparison of middle level managers in study and control groups with iso-strain before the intervention using the selected scales of the JCQ

Iso-strain	Study group n = 92		Control group n = 90		Significance
	No	%	No	%	
Present	14	15.2	9	10.0	$\chi^2 = 1.12$ df = 1, p = 0.29
Absent	78	84.8	81	90.0	

It was observed that 14 middle level managers (15.2%) in the study group and 9 middle level managers in the control group (10.0%) had iso-strain. The chi-squared test revealed no significant difference between the two groups ($p>0.05$). Table 4.35 shows the comparison of middle level managers in the study and the control groups with the status of psychological distress before the intervention.

Table 4.37 Comparison of middle level managers in the study and control groups with the status of psychological distress before the intervention using GHQ -30

Psychological distress	Study group n = 92		Control group n = 90		Significance
	No	%	No	%	
Present (GHQ 30 score ≥6)	26	28.3	23	25.6	$\chi^2 = 0.169$ df = 1, p = 0.681
Absent (GHQ 30 score < 6)	66	71.7	67	74.4	

Twenty six middle level managers in the study group (28.3%) and 23 middle level managers (25.6%) in the control group had psychological distress during the pre-intervention assessment. There was no significant difference in the status of psychological distress between the two groups (p>0.05).

4.5.3 Post- intervention assessment

After completion of the pre-intervention assessment, the intervention which consisted of seven self-learning modules and a three hour stress management workshop was implemented among the middle level managers of the study group. The control group was not subjected to the intervention. Six months after the completion of the intervention, the middle level managers were subjected to a re-assessment (post-intervention assessment) which was identical to the pre-intervention assessment. The control group too was subjected to this identical assessment. The evaluation tools of the post-intervention assessment were the same as used in the pre-intervention assessment. Table 4.36 shows the comparison of middle level managers in the study and control groups before and after the intervention using the three selected scales of the JCQ.

Table 4.38 Comparison of iso-strain in middle level managers of the study and control groups before and after the intervention using the JCQ

Status of iso-strain	Study group				Significance	Control group				Significance
	Pre n = 92		Post n = 89			Pre n = 90		Post n = 88		
	No	%	No	%		No	%	No	%	
Present	14	15.2	12	13.5	$\chi^2 = 0.11$ df = 1 p = 0.74	9	10.0	8	9.1	$\chi^2 = 0.04$ df = 1 p = 0.84
Absent	78	84.8	77	86.5		81	90.0	80	90.9	

Post-intervention assessment of iso-strain in the study group revealed, that 12 middle level managers (13.5%) had iso-strain while 8 middle level managers (9.1%) in the control group had iso-strain. It was observed that the iso-strain, in the study group had decreased from 14 (15.2%) to 12 (13.5%) during the period of intervention.

Chi-square test was used to determine the statistical significance of the pre- and post-intervention status of iso- strain and a statistically significant difference was not observed in the study group (p>0.05). The status of iso-strain in the control group has

decreased from 10.0% to 9.1% at post-intervention assessment. This decrease too was not statistically significant ($p>0.05$).

Table 4.39 presents the comparison of the status of psychological distress measured using the GHQ-30 in middle level managers of the study and the control group before and after the intervention.

Table 4.39 Comparison of the status of psychological distress in the study and the control groups before and after the intervention using the GHQ 30

Psychological distress	Study group				Significance	Control group				Significance
	Pre n = 92		Post n = 89			Pre n = 90		Post n = 88		
	No	%	No	%		No	%	No	%	
Present (GHQ 30 score ≥6)	26	28.3	18	20.2	$\chi^2 = 1.58$ df = 1 p = 0.21	23	25.6	21	23.9	$\chi^2 = 0.07$ df = 1 p = 0.79
Absent (GHQ 30 score < 6)	66	71.7	71	79.8		67	74.4	67	76.1	

Post-intervention assessment of the status of psychological distress in the study group revealed that 18 (20.2%) middle level managers had psychological distress while it was 21 (23.9%) in the control group. The status of psychological distress has decreased from 26 (28.3%) to 18 (20.2%) in the study group during the period of the intervention. It was not possible to detect a statistically significant difference in the study group with regard to the status psychological distress during pre and post intervention assessment period ($p>0.05$).

It was found that 21 middle level managers (23.9%) had psychological distress in the control group at the post-assessment while 23 (25.6%) middle level managers had psychological distress at the pre-assessment. The psychological distress has decreased from 23 (25.6%) to 21 (23.9%) in the control group during this period and it too was not statistically significant ($p>0.05$).

Table 4.40 presents the comparison of iso-strain in middle level managers of the study and the control groups at the post-assessment.

Table 4.40 Comparison of iso-strain in middle level managers of the study and control groups after the intervention using the three selected scales of the JCQ (post-post)

Status of iso-strain	Study group n = 89		Control group n = 88		Significance
	No	%	No	%	
Present	12	13.5	8	9.1	$\chi^2 = 0.85$ df = 1, p = 0.36
Absent	77	86.5	80	90.9	

It was observed that 12 (13.5%) middle level managers had iso-strain in the study group while it was 8 (9.1%) in the control group. There was no statistically significant

difference in the status of high occupational strain in the study and control groups at the post assessment ($p>0.05$).

Table 4.41 presents the comparison of the status of psychological distress in middle level managers of the study and the control groups at the post-intervention assessment.

Table 4.41 Comparison of psychological distress in middle level managers of the study and control groups after the intervention using the GHQ-30

Psychological distress	Study group n = 89		Control group n = 88		Significance
	No	%	No	%	
Present (GHQ 30 score ≥6)	18	20.2	21	23.9	$\chi^2 = 0.34$ df = 1, p = 0.56
Absent (GHQ 30 score <6)	71	79.8	67	76.1	

The study group had 18 (20.2%) middle level managers with psychological distress while there were 21 (23.9%) in the control group. The difference in the status of psychological distress in the study and control groups at the post-intervention assessment was not statistically significant ($p>0.05$).

Table 4.42 presents the change (pre- and post- intervention) in the number of middle level managers with iso-strain in the study and the control groups.

Table 4.42 Comparison of the change (pre- and post- intervention) in the number of middle level managers with iso-strain between the Study and control groups

	Number of middle level managers with iso-strain		Significance
	Study	Control	
Pre- intervention	14	9	$\chi^2 = 0.29$ df = 1, p = 0.9*
Post- intervention	12	8	
Total	26	17	

** Significance tested by McNemar chi-square test*

It was shown that the number of middle level managers with iso-strain has decreased from 14 to 12 in the study group and the number had decreased from 9 to 8 in the control group. This change in the status of iso-strain between the two groups at pre- and post- intervention assessment was not found to be statistically significant ($p>0.05$).

The change in the number of middle level managers with psychological distress, at pre- and post-intervention, in the study and the control groups is shown in table 4.43.

Table 4.43 Comparison of the change (pre- and post-intervention) in the number of middle level managers with psychological distress in the study and control groups

	Number of middle level managers with psychological distress (GHQ 30 score =>6)		Significance
	Study	Control	
Pre- intervention	26	23	$\chi^2 = 0.41$ df = 1, p = 0.56*
Post- intervention	18	21	
Total	44	44	

** Significance tested by McNemar chi-square test*

The change in the status of psychological distress between the two groups is not found to be statistically significant (p>0.05).

4.5.4 Assessment of compliance

The answer sheet for each module was returned by all middle level managers in the study group. Out of the 92 study group middle level managers 90 participated for the stress management workshop. Compliance to the total intervention was assessed after six months by self reports and the results are shown in Table 4.44.

Table 4.44 Compliance of the study group to the intervention

Compliance to the intervention	Complied		Cannot say		Did not comply	
	N	%	N	%	N	%
Practiced stress management methods	63	70.0	18	20.0	9	10.0

Chapter 5

Discussion

Occupational stress can no longer be considered as occasional. It is becoming an increasingly global phenomenon, affecting all categories of workers in every country. According to the DCS model, three cardinal factors, decision latitude, psychological demands of the job and work related social support are important determinants of job stress, having significant effects on health, cardiovascular health in particular (Theorell and Karasek 1996). Occupational stress as a major occupational hazard has been studied with resulting awareness and acceptance in many industrialized countries, and yet only a few studies have been conducted in the developing world on this area (Karasek *et al* 1998; Kawakami and Haratani 1999).

The present study was carried out to assess the prevalence and correlates of occupational stress in middle level managers and operational staff members of domestic commercial banks in the Colombo district. In addition, an intervention was carried out to assess its effectiveness in reducing occupational stress in middle level managers.

5.1 Study design

Component one of the study validated three major scales of the JCQ which was used in the assessment of occupational stress in component two of the present study. It assessed the validity and reliability of the selected scales before its application in component two where prevalence of occupational stress was assessed. The selected scales were found to be a valid and a reliable tool to assess occupational stress in the study populations. The psychological scale had lower reliability compared to decision latitude and social support scales but still it was within the accepted range specified by Cronbach (1951).

The second component assessed the prevalence and correlates of occupational stress in middle level managers and operational staff members in domestic commercial banks in the Colombo district. A cross-sectional study design was thought appropriate as it surveys a situation existing at a given point of time (Abramson and Abramson 1999). Broadening of knowledge is an aim in many cross- sectional studies in addition to studying the burden of disease to plan health interventions and to promote the health of the population studied (Abramson 1991).

The prevalence study was carried out in domestic commercial banks in the district of Colombo. Thus prevalence estimates in this study may not be generalized to the entire population of banking workers of Sri Lanka. The internal validity should not be compromised in an attempt to achieve generalizability or external validity, as generalizability can be inferred with only for a valid result (Hennekens and Buring 1987). The selection of Colombo district as the study area improved the quality of data of the study in many ways. There are eleven registered domestic commercial banks in Sri Lanka and some of the banks do not have branches in other districts. Some banks do have branches but still the number of branches is small in other districts. It was possible to select an adequate sample from all eleven domestic commercial banks due to Colombo district being the study area. It was also feasible for the principal investigator to have close supervision on data collection.

It was decided to assess occupational stress in two categories of banking employees working in branches, namely, middle level managers and operational staff members.

The correlates of occupational stress in the two categories were assessed separately as the two groups were distinct categories in terms of the work they did and their job roles and responsibilities. This is important in planning interventions on occupational stress since the job content and environment differ in different categories of workers.

Middle level managers and operational staff members with at least one year of experience in the respective category were included in the study. According to LaMontagne *et al* (2004), adverse effects on mental health of workers can occur from one year of exposure to occupational stress. Probability proportionate to size, cluster sampling method was used in this study and it enabled the intended sample to be as representative as possible (Hulley and Cummings 1998). Cluster sampling has advantages and disadvantages. It is comparatively simple because a researcher does not need to know details about all the sampling units in the total sampling frame but needs to obtain only a list of units in the selected clusters. In addition, it can be done with less traveling and utilization of other resources effectively making the data collection more cost effective. Therefore, it was more suitable as well as cost effective for the present study since the middle level managers and operational staff members were scattered in a large number of bank branches within the Colombo district. On the other hand, it was not possible to obtain details about all the workers in the two study populations in the Colombo district bank branches from all the eleven domestic commercial banks making simple random sampling impossible.

Cluster sampling has disadvantages as well. A potential problem is that cluster members are more likely to be alike than those in another cluster and it is well known that the conclusions drawn from a survey using cluster sampling is less precise than a survey which has been done with simple random sampling if modifications for sample size calculations are not addressed. These problems were addressed in the present survey by calculating the design effect and multiplying the sample size by the design effect to account for the clustering effects. Increasing the number of clusters, while decreasing the cluster size in each category, achieved a more representative sample of banking employees.

5.2 Validity of data

Every effort was made to ensure the validity of data. Self-administered questionnaires were used in the cross-sectional component of the study.

Two self-administered questionnaires were used to measure occupational stress and the correlates of occupational stress in the study groups, namely the three selected major scales of the JCQ and the 20 item correlate questionnaire prepared by the PI. Self-administered questionnaires have been found to yield appreciably more accurate responses for emotional disturbances, disability, and pain than interviewer administered questionnaires, and its use eliminates the interviewer bias as well (Abramson and Abramson 1999). Structured interviews which are time consuming and costly in a workplace setting were not attempted due to logistic reasons and also due to unavailability of validated interviewer schedules for using in local settings. Bank workers are extremely busy and it was not possible for them to spend a lot of time at data collection. The three selected scales of the JCQ had questions on supervisor support and co-worker support which are sensitive in nature and therefore self-administration of the questionnaire, anonymity and confidentiality would increase the response rate. Furthermore, subjectivity bias in the self-report measures was reduced by using validated and standardized scales for the assessment of job stress (Karasek *et al* 1998).

To overcome the problem of bias in self-report data, more 'objective' measures of job stress have been developed (Karasek *et al* 1998). With the imputation method, national average scores of job characteristics for a particular job title are imputed to individuals holding that job title. The problem with this method is that large nationally representative survey data have to be available. Also, the method may lead to misclassification because the variance in job characteristics within occupations is not taken into consideration; this is especially problematic regarding the scale of job demands. Another alternative for self-report data is to have job characteristics estimated by means of expert observations. However, there are important practical problems associated with expert ratings: they are very time consuming and costly. Moreover, the reliability of this measurement is correlated with the job status: it is usually easier to measure characteristics of low-status jobs than of high-status jobs.

When comparing objective and subjective assessments of job stress, fairly good agreements have been reported for decision latitude but not so much for psychological job demands (Ostry *et al* 2001; Theorell & Hasselhorn 2005). On the whole, it can be argued that the division between so-called 'objective' and 'subjective' measures is not very useful, because obviously both methods have their strong and weak points (Kompier 2005). So there is no reason to decide whether 'objective' or 'subjective' assessment methods are more valid; since they supplement each other and preferably both should be included in studies (Kristensen 1995).

Dichotomous variables (low versus high) were created for decision latitude, psychological demands and social support scales of the JCQ based on the median values as suggested by the authors (www.jcqcenter.org) and used by other researchers (Aziah *et al* 2004; Huda *et al* 2004). Median values were computed for middle level managers and operational staff separately. High job strain refers to the combination of high job demands and low decision latitude (Karasek *et al* 1981). Iso-strain or isolated strain was defined as high job strain combined with low social support (Johnson & Hall 1988).

The importance of the psychosocial work environment, in particular job stress, for workers' health and well-being has been increasingly acknowledged during the last decades. The DC model has been the most influential model in research on the effect of job stress on health and well-being (Karasek 1979; Karasek & Theorell 1990). In the eighties the model expanded with a social dimension (Johnson & Hall 1988; Johnson *et al* 1989), and this expansion was soon accepted by the creator of the DC model (Karasek & Theorell 1990). The DCS model acknowledges that social support is vital for the employee when coping with different demands at work. Karasek (1985) proposed the JCQ as a standardized instrument to assess job stress based on the theoretical models.

The JCQ has been proven a valid and reliable tool to measure job stressors (Karasek *et al* 1998). The JCQ has been the most popular instrument designed for the assessment of the psychosocial work environment (Hurrell *et al* 1998). It is currently the most widely used workplace environment questionnaire and is now available in over 22 languages (Clays 2007). The validity of the JCQ in various languages has been assessed in some recent works in Japan, Malaysia, and Taiwan in addition to the United States, Canada, Netherlands and Sweden (Karasek *et* al 1998; Edimansyah *et al* 2006; Liu *et al* 2004). The three scales of the JCQ have shown acceptable validity and reliability in developed as well as developing countries in Asia.

5.2.1 Minimizing non-response bias

Non-response bias may result from inability to include all the selected subjects (Hennekens and Buring 1987). Respondents who fail to reply to questionnaires or refuse an interview are always a cause of concern. If persons who respond differ substantially from those who do not, the results do not directly allow one to say how the entire sample would have responded, certainly an important step before the sample is generalized to the population. Incomplete responses introduce uncertainty to the accuracy of the findings. Therefore, non-response bias can affect the internal as well as the external validity of a study hence the desire to get as high a response rate as possible to overcome this problem.

The most commonly recommended protection against non response bias has been the reduction of non response itself. Response rates were 96.4% and 91.6% for middle level managers and operational staff members respectively in the cross-sectional study in component two and these rates are considered not large enough to interfere with the internal validity. A high response rate was ensured by adopting the following techniques. Data collection was carried out by pre-intern medical doctors. This increased the acceptance of the data collectors by the banking employees. The names of the data collectors with their identity card numbers were given to the branch managers prior to visiting the branches. The PI contacted the branch managers and explained the study before the data collectors visited the branches. Further, the subjects were made aware of the study by including details about the study by way of an information sheet which was given to each subject. In addition the respondents were assured that anonymity and confidentiality would be maintained. They were informed that the survey was not carried out by the bank management but independently, for research purposes, by a medical officer. The subjects were instructed to return the completed questionnaires under sealed cover to the field investigators (FI). In addition the personal address and the contact numbers of the PI were given to them in case they wished to seek clarification.

5.2.2 Minimizing information bias

The study was carefully designed and conducted to minimize information bias. All possible measures were adopted to ensure that self-reports were reliable. The prevalence of occupational stress was assessed using three scales from the JCQ, namely, decision latitude, psychological demands and social support at work scales. The social support scale consists of two subscales namely the supervisor support and co- worker support subscales. The respondents were asked to return the questionnaire in envelopes addressed to the PI under sealed cover since in Sri Lankan culture the subordinates would not like to give their opinion freely regarding their supervisors as in western cultures.

5.3 Prevalence of occupational stress

According to the DC model, adverse health effects are expected when workers are exposed to high psychological demands in combination with low decision latitude or job control which is labeled as high job strain. The DCS model postulates that workers with high job strain with low social support at work belong to the iso-strain category and they are most vulnerable to negative health effects (Johnson and Hall 1988). In the present study, occupational stress was assessed using the three selected scales from the JCQ based on the DC and DCS models (Karasek & Theorell 1990).

It was found that the difference between the prevalences of iso-strain among middle level managers and the operational staff members in the banking sector were

statistically significant (p=0.049) and the difference between the prevalences of high job strain among the two study populations was much significant (p=0.01). This can be explained by looking at the median values of the scales of the DCS model used in the assessment of high job strain and iso-strain. The decision latitude scale encompasses decision authority, which refers to the workers authority to make decisions involving how the work is done and skill discretion which refers to his or hers opportunity to use a variety of skills on the job. The median for decision latitude for middle level managers was 66 while it was 58 for operational staff members indicating that the decision latitude or the job control of the operational staff members is lower compared to the middle level managers. This was not observed for the other two scales. The median for psychological demand scale is 34 for middle level managers while it is 35 for the operational staff members reflecting slightly higher but non significant (p>0.05) psychological demands among the operational staff members. The median for the social support was 24 for both categories. According to DCS and DC models it is postulated that low control with high psychological demands gives rise to high job strain and iso-strain. Therefore, the operational staff members have more occupational stress than the middle level managers. This is in agreement with the study done by Kawakami *et al* (1995) where it was shown that individuals in higher occupational classes had high scores for decision latitude. Cheng *et al* (2003) studied the reliability and the validity of the Chinese version of the JCQ in Taiwanese workers and found that the skill discretion and decision authority thereby decision latitude increase along with employment grade. The Victorian job stress survey done by LaMontagne *et al* (2006) reported similar findings. It is clear that high job strain and iso-strain increased with lower levels of occupational class in males. As observed in male workers, female workers in higher skill level jobs had lower levels of job strain.

The difference in the prevalence of iso-strain (p=0.6) or high job strain (p=0.569) among female and male middle level managers was not statistically significant. It was also noted that there was no significant difference (p=0.298) between the prevalence of iso-strain among female and male operational staff members while the difference between the prevalence of high job strain was found to be significant (p=0.04).

It was observed that the female and male operational staff members had different patterns of JCQ scale scores. The median for decision latitude of the female operational staff members was 60 while it was 58 for male operational staff members. The median for psychological demands in female and male operational staff members was 35 and 36 respectively. Therefore male operational staff members had perceived low decision latitude and more psychological demands compared to their female counterparts resulting in increased high job strain. The median for the skill discretion in female and male operational staff members was 32 while the means 32.3 (SD = 4.7) and 32.2 (SD = 4.5) respectively. The means for the decision authority subscale for female and male workers were 27.5 (SD = 6.0) and 26.2 (SD = 6.5) with a median of 28 for females and 24 for males. This indicates that female operational staff members think that they have more authority over their jobs than the male workers. This finding is contradictory to the findings found in some studies world over (Kawakami *et al* 1995; Karasek *et al* 1998; Cheng *et al* 2003; Neidhammer 2002; Kawakami and Fujigaki 1996).

It is interesting to note that the means for decision authority in female and male middle level managers were 31.94 (SD=6.3) and 32.3 (SD=6.0) respectively with a median of 32 for both categories. The median for skill discretion was 34 for both male and female middle level managers while the means were 34.8 (SD=4.4) and 34.1 (SD=3.98) for females and males respectively. It is shown that the male middle level managers

perceived that they have slightly more decision authority than their female counterparts. The perceived social support at work was similar among male and female operational staff members.

Some studies on occupational stress have concluded that female workers perceived more occupational stress than their male counterparts (Bright 2001; Smet *et al* 2005; LaMontagne *et al* 2006). The transactional approach to the stress process is one of several models available for understanding the relationship between occupational stress and health (Cooper *et al* 2001; Kahn & Byosiere 1992). It postulates that individuals participating in the same job environment will not experience the same stressors to the same degree, exhibit identical reactions, or cope with the stressful situation in the same way. Eisler *et al* (1988) state that masculine gender role stress results in more men than women presenting with symptoms of anger, anxiety and health risk behaviours. It was also revealed that male and female workers experience stress in different ways often due to gender role pressures. A reason why male workers may show greater signs of stress may be due to lack of motivation and boredom in their current job. It could also be due to masculine role pressure under which they are expected to cope with certain stressors without seeking assistance in areas that may trouble them. Decreased interest or meaningfulness in their current work due to lack of new challenges or opportunities also could create occupational stress in male workers.

Although banking is considered a stressful job, there is very little information regarding job stress prevalence exclusively for banking staff from studies done world over using the DCS model. According to the Victorian job stress survey done in Australia in 2006, on 1101 workers (526 males and 575 females) employed in government and private, service and manufacturing sector companies, using the DC model it was observed that the prevalence of high job strain in managers (skill level 5) was 11.8% while among clerks (Skill level 3) was 17.5% workers and 35.7% blue collar workers. Participants were aged 40-60 years with a mean age of 50 years (SD=4.8). Occupational stress was measured using the scales of the JCQ in this study. The prevalence of high job strain was 15.4% among the male workers and the prevalence of iso-strain among them was 9.7%. The prevalence of high job strain among female workers was 22.5% while the prevalence of iso-strain was 12.3%.

According to the study done by Smet *et al* (2005) 16% of male managers had high job strain while it was 15.6% for female managers. It was also found out that 22.7% of male clerks and 20% of female clerks had high job strain.

The reported prevalences were not directly comparable with the present study since those have been done in various occupational settings. But still, it can be seen that the prevalences obtained in the present study are higher compared to the above studies. Smet *et al* (2005) reported that there were differences in the perception of occupational stress, according to the national, cultural membership of the group compared. They further reported that the explanation for these regional differences in the perception of occupational stress could be attributed to differences in culture, economic, environment and work organization in the particular region with unavoidable interactions between these factors. Culture could determine stress perception related dimensions such as coping strategies or social support. Some studies have reported significant differences in the stress levels and coping mechanisms of workers in different cultures (Cooper and Arbos 1984; Etzion *et al* 1982).

In addition to the national, regional and cultural differences in the perception of

occupational stress, the banking sector in Sri Lanka has grown rapidly over the past 20 years. The many challenges in the work environment characterized by heightened competition among banks, both domestic as well as international have resulted in improving productivity and in cost cutting strategies which have resulted in increasing demands on employees. The International Labour Organization has reported similar findings in its report in 2001. New products and ways of delivering services such as the telephone and internet, long working hours with holiday banking, new entrants to the market competing with the existing domestic banks all have contributed to rising occupational stress level in banking employees. The banking industry continues to change in order to meet the challenges posed by emerging technologies and business processes and these have placed immense pressure on the employees. Sisson and Marginson (2006) have reported similar findings. Hall and Savery (1986) reported that heightened competition, continuous technological development, conflicting demands from organizational stakeholders have resulted in higher job strain in workers. Therefore the higher prevalences of iso-strain and high job strain obtained in the present study for middle level managers and operational staff members could be attributed to the above mentioned factors as well.

5.4 Correlates of iso-strain and high job strain

The correlates were identified by comparison of the middle level managers with iso-strain and those without iso-strain. Correlates were also assessed for high job strain in middle level managers. The high job strain category was defined as workers with low decision latitude and high psychological demands while the iso-strain category was defined as having low decision latitude, high psychological demands and low social support at the workplace according to the DCS model. The median of each scale was taken as the cut off. Similarly, correlates were also assessed for iso-strain and high job strain among operational staff members separately.

5.4.1 Socio- demographic correlates

5.4.1.1 Age

In the present study, there was no statistically significant association between the age of middle level managers either with iso-strain or high job strain ($p>0.05$).

Among operational staff members, 85 (80.2%) of workers with iso-strain were less than 35 years of age. It was observed that there was a statistically significant association with iso-strain and the age of operational staff members ($p=0.004$). It can be concluded that young staff operational staff members perceived more iso-strain compared to their older counterparts. Similarly age was found to be significantly correlated with high job strain among operational staff members.

According to LaMontagne *et al* (2006) younger males had the highest prevalence of high job strain which showed statistical significance in Logistic regression. Chandraiah *et al* (2003) and Dua (1994) reported similar findings. The workers in the young adult group would have been in service in their jobs for a shorter period of time. In addition, they may be getting adjusted to their jobs as well as the demands of young married life. Under such circumstances it may be expected that compared to the middle aged who are more or less settled in their personal as well as occupational life, young adults found their jobs more stressful. However this association was not found to be statistically significant in logistic regression in the present study.

5.4.1.2. Sex

In the present study, a statistically significant association could not be found between

iso-strain or high job strain and sex of the middle level managers in the bivariate analysis ($p>0.05$).

Sex was not significantly associated with either iso-strain or high job strain among operational staff members ($p>0.05$). Forgerty *et al* (1999) did not find gender to be correlated with occupational stress. Netterstorm *et al* (2000) using the DC model, showed that women were more likely to experience high occupational strain than men. There is continuous debate regarding the role that gender plays in relation to occupational stress. Results from studies have been inconsistent. Di salvo *et al* (1995) investigating gender differences in the perception of occupational stress in managers in banks and human service agencies reported no significant gender differences in the perception of occupational stress. Martocchio and O'Leary (1989) state that the reason for the many contradictory findings in the literature regarding stress and gender differences can be attributed to very little reliability on the information available for the stress measures used in the studies, inequality in the sampling used and questionable validity of the psychosocial measures used in the assessment of occupational stress. However there may be several other reasons why gender studies report contradictory results.

5.4.1.3 Ethnicity

Smith *et al* (2005) found that there was a statistically significant association between work stress and ethnicity. A statistically significant association between iso-strain or high job strain and the ethnicity of the worker was not found among middle level managers in the bivariate analysis in the present study ($p>0.05$). The same was true for operational staff members ($p>0.05$).

5.4.2 Socio- economic correlates

5.4.2.1 Level of education, marital status and average monthly salary

The level of education, marital status or average monthly salary did not have a statistically significant association with iso-strain in middle level managers in the present study ($p>0.05$). Though the level of education and marital status was not significantly correlated with high job strain among middle level managers ($p>0.05$) average monthly salary was found to be a significant correlate of high job strain ($p=0.03$). Drawing an average monthly salary of less than fifty thousand rupees was seen to be protective against high job strain in middle level managers (OR=0.5; 95% CI 0.3-0.9).

The level of education, marital status or average monthly salary did not have a statistically significant association with iso-strain in operational staff members in the present study ($p>0.05$). Different patterns were observed with high job strain in operational staff members. Being unmarried was a significant correlate of high job strain ($p=0.03$) in operational staff members in the bivariate analysis and it was shown to be significant even after adjusting for confounding factors in the regression model at 0.05 significance level. It was observed that currently unmarried operational staff members had 1.5 times greater risk of developing high job strain than the currently married counterparts according the adjusted odds ratio (95% CI 1.003-2.3). However, other socio-economic variables considered in the present study did not show a significant association with high job strain among operational staff members ($p>0.05$).

5.4.3 Occupational correlates

There was no statistically significant association between the occupational variables and iso-strain or high job strain among middle level managers ($p>0.05$).

A statistically significant association was found between iso-strain and the service in the currently working bank among operational staff members in the bivariate ($p<0.001$) as well as at 0.05 significance level in the regression model. . The duration of service as an operational staff member too was significantly correlated with the status of iso-strain in the bivariate analysis in the present study ($p<0.001$). Similar findings were observed for these two variables and high job strain among operational staff members in the bivariate analysis ($p<0.05$). Average working hours per week was found to be a significant correlate of high job strain among operational staff members ($p=0.01$). Major *et al* (2002) reported that the number of work hours is a related added risk of work family conflict and decline in mental health.

Seventy two point six percent (72.6%, n=77) of the operational staff members with iso-strain had ten or less years of service in the bank. It can be considered that these workers did not have much time to get adjusted to the working environment since it was a relatively shorter period of time. This finding is in consistent with the study done by Chandraiah *et al* (2003) where he showed that middle level managers with less than ten years of service had significantly higher levels of occupational stress than the older middle level managers.

5.4.4 Home-work interface

Home work interface is one of the six categories of work stressors identified by Cooper (1986). The interdependence between the work and family domain has become an important research theme (de Jonge *et al* 2003). Spill over effects of stress between work and family has been found (Doby and Caplan 1995; Edward and Rothbard 1999). Frone *et al* (1992a) found that job stress increased work to family conflict. Grandey and Cropanzano (1999) reported similar findings.

5.4.4.1 Time spent with the family

A significant association was not shown between iso-strain and the time spent with the family variable among the middle level managers ($p>0.05$). In contrast, a higher proportion of middle level managers (96.8%, n=61) with high job strain perceived that the time spent with the family has been reduced and therefore, time spent with the family variable was found to be a significant correlate of high job strain among middle level managers ($p=0.003$).

A significant association was not shown between iso-strain and the time spent with the family variable among operational staff members ($p>0.05$). A higher proportion of operational staff members (96.6%, n=173) with high job strain perceived that the time spent with the family has been reduced and reduction of the time spent with the family was found to be a significant correlate of high job strain among operational staff members ($p=0.007$).

5.4.4.2 Perceived anger due to work related problems at home

A statistically significant association between iso-strain ($p=0.2$) or high job strain ($p=0.2$) and perceived anger due to work related problems at home was not observed among middle level managers.

Perceived anger due to work related problems at home was significantly correlated with high job strain ($p<0.001$) and iso-strain ($p<0.001$) among operational staff members in the bivariate analysis. This was found to be a significant correlate of high job strain ($p=0.002$) as well as iso-strain ($p=0.01$) in the logistic regression models at 0.05 significance level.

5.4.4.3 Family problems affecting work

It was observed that there was a statistically significant association between iso-strain and family problems affecting work variable among middle level managers ($p<0.05$) while it was not so for high job strain among them ($p=0.08$) in the bivariate analysis. Middle level managers with iso-strain have low social support at work. Lack of social support at work could have made them more stressful at home creating family problems or family problems could have made the middle level managers more stressful at work resulting in lack of social support at work.

A statistically significant association between iso-strain and family problems affecting work variable was found among operational staff members ($p<0.05$) in the bivariate analysis. Family problems affecting work was significantly associated with high job strain among operational staff members ($p=0.03$) too. Operational staff members are younger with a mean age of 31.7 (SD=8.9) compared to middle level managers whose mean age is 45.1 (SD=6.9) and getting adjusted to new married life as well as child rearing problems would be more among them compared to middle level managers who are mostly settled in life.

5.4.4.4 Taking office work home

Taking office work home was found to be significantly correlated with iso-strain ($p=0.038$) as well as high job strain ($p=0.01$) among middle level managers. It was observed that taking office work home was a significant correlate of high job strain ($p=0.01$) and iso-strain ($p=0.009$) after adjusting for confounding in the logistic regression models at 0.05 significance level. It was also observed that middle level managers with high job strain took office work home 2.3 times higher than those without high job strain (Adjusted OR=2.3; 95% CI 1.2-4.5) while middle level managers with iso-strain took office work home 3.1 times than those middle level managers without iso-strain (Adjusted OR= 3.1; 95% CI 1.3-6.9). It can be seen that middle level managers with iso-strain have lower social support at work than the middle level managers with high job strain and they are more prone to take office work home.

However taking office work home was not found to be a significant correlate of iso-strain or high job strain among operational staff members ($p>0.05$). Middle level managers have to generate reports for senior management and they have to plan and coordinate activities in the branches whereas operational staff members have to perform routine day to day activities in a branch. The difference in job function could be one of the reasons for the observed difference in taking office work home variable in the present study.

It can be concluded that high job strain and iso-strain are associated with increased work to family as well as family to work conflict among the two study populations. The rise of dual earner couples and increasing female participation in working life has transformed the ways couples manage work and family responsibilities. Frone *et al* (1992a); Grandey and Cropanzano (1999) found that job stress increased work to family conflict resulting in greater family distress whereas family stress increased family to work conflict which in turn led to greater job stress. Suchithara pal (2005) reported that family problems affecting work is a correlate of job stress in a study done in India among nurses.

5.4.5 Personal characteristics of the worker

It has been reported that specific personal characteristics appear to affect the degree to

which particular events or conditions are perceived as being stressful (Ganster and Schaubroeck 1991; Kobasa 1979; Perlin and Schooler 1978; Watson and Pennebaker 1989). These personal factors are assumed to be associated with a greater likelihood that individuals will experience stress, be unable to manage stressful demands, take longer to recover from the effects of stress or suffer negative outcomes as a consequence of stress. A broad range of aversive mood states including anger, disgust, and guilt has been classified as negative affectivity and workers with negative affectivity characteristics are found to be prone to high occupational stress (Watson and Clarke 1984).

Perceived anxiety at work and perceived inability to cope with work stress showed significant associations with iso-strain ($p<0.05$) as well as high job strain ($p<0.05$) among middle level managers in the bivariate analysis. Frequent feeling of anger while at work ($p=0.02$) was found to be a significant correlate of iso-strain among middle level managers while it was not so for high job strain ($p=0.2$). It can be seen that middle level managers with low social support at work tend to become angry while at work more than those who have high social support at work. Perceived inability to cope with family stress was not significantly associated with iso-strain or high job strain among middle level managers in the present study ($p>0.05$). Diamond (1990) has stated that workers, who can cope well, will have more control over the demands, and therefore they will experience less stress.

In the present study, perceived anxiety at work ($p<0.001$), frequent feeling of anger while at work ($p<0.001$), perceived inability to cope with work stress ($p<0.001$) and perceived inability to cope with family stress ($p<0.001$) showed highly significant associations with iso-strain among operational staff members. Similar significant associations were observed with high job strain and the personal characteristic variables selected in the present study ($p<0.05$).

5.4.5 Factors intrinsic to the job

According to Cooper (1987), factors which are intrinsic to a particular occupation may have a serious negative impact on the psychological wellbeing of workers. Work hours (De Raeve *et al* 2007; Sparks *et al* 1997) risks and danger, new technology (Cartwright and Cooper 1997; Korunka *et al* 1995) have been reported as correlates of occupational stress. Working with cash (Lindstrom 1991) and continuous contact with the public (Endresen *et al* 1991) have been proven to exert high job strain on workers in banks. According to Mocci *et al* (2001), computer based jobs are less demanding in terms of physical effort, but require more cognitive processing and mental attention. Technological developments have led to major advances in office automation and banking industry has been a leading investor in computer technology due to its substantial data processing requirements.

5.4.5.1 Handling cash

In the present study, handling cash was not found to be significantly correlated with iso-strain ($p=0.87$) or high job strain ($p=0.9$) among middle level managers.
In contrast, handling cash was found to be a significant correlate of iso-strain ($p=0.006$) as well as high job strain ($p=0.001$) among operational staff members. According to Lindstrom (1991) handling cash is a correlate of high occupational stress in bank workers.

5.4.5.2 Verbal abuse and hostility from customers

Verbal abuse and hostility from customers was not found to be a significant correlate of

iso-strain (p=0.059) or high job strain (p=0.1) among middle level managers.

However, verbal abuse and hostility from customers was found to be a significant correlate of iso-strain (p<0.001) and high job strain (p=0.001) among operational staff members in the bivariate analysis.

5.4.5.3 Perception of working with customers

There was a statistically significant association between iso-strain as well as high job strain and the perception of working with customers being stressful in both study groups (p<0.05).

5.4.5.4 Perceived delays in data processing and breakdown of computer systems in the bank

With reference to Table 4.15 perceived delays in data processing and breakdown of computer systems in the bank were not found to be significant correlates of iso-strain or high job strain in middle level managers (p<0.05).

In contrast perceived delays in data processing variable was found to be a significant correlate of iso-strain (p<0.001) as well as high job strain (p<0.001) among operational staff members. Perception of frequency of breakdown of computer systems in the bank variable too was significantly correlated with iso-strain (p=0.026) as well as high job strain (p=0.01) among operational staff members.

In summary, working with customers was found to be significantly correlated with iso-strain and high job strain in middle level managers in the bivariate analysis (p<0.05). Handling cash, verbal abuse and hostility from customers, perceived delays in data processing and perception of the frequency of breakdown of computer systems in the banks were identified as significant correlates of iso-strain and high job strain among operational staff members in domestic commercial banks in the bivariate analysis (p<0.05). Cash handling physically is done by operational staff members at the counters of bank branches. Operational staff members have to cater to the needs of the present day demanding customers since they work at the entry level, always in interpersonal contact with the customers face to face and computer based problems would have a direct bearing on their job than the middle level managers. This is clearly shown in the present study.

5.4.6 Career development

Perceived opportunity for promotions (p=0.01) and perceived job satisfaction (p<0.001) were significantly correlated with iso-strain among middle level managers while perceived job insecurity was not (p=0.4). It was also observed that perceived opportunity for promotions (p=0.04) and perceived job satisfaction (p<0.001) were significantly correlated with high job strain among middle level managers while perceived job insecurity was not (p=0.2).

There were highly significant associations between iso-strain and perceived job security (p<0.001), perceived opportunity for promotions (p<0.001) and perceived job satisfaction (p<0.001) variables among operational staff members in the bivariate analysis. Similar findings were observed for high job strain as well, among operational staff members.

Fifty seven percent of operational staff members with iso-strain reporting that their job security was not satisfactory were below 30 years of age while 95.4% were below 40

years of age. Job dissatisfaction and lack of opportunity for promotions too were mostly reported by young workers below 40 years.

The finding is consistent with studies done by several researchers where they have reported that low job satisfaction was associated with high occupational stress (Holligworth *et al* 1988; Keller *et al* 1975; Leigh *et al* 1988).Several researchers reported that in industrial settings job satisfaction and job involvement increased with age and as a result occupational stress would decrease (Cherrington 1979). Wild and Dawson (1972) reported that job satisfaction is related to age and the length of service in the organization. Drafke and Kossen (2002); and Greenberg and Baron (1995) stated that older people are generally happier with their jobs than younger employees although no specific reason has been attributed to this. Mottaz (1987) in Oshagbemi (2003) cited several reasons for the variance in job satisfaction between older and younger workers. Younger worker are generally more dissatisfied than older employees simply because they demand more than their jobs can provide. The author postulates that as older workers possess more seniority and work experience and it enables them to feel work as relatively less strenuous than younger workers. According to Oshagbemi (2003), employees have expectations at the time of appointment, but when these expectations are not met; resultant effect leads to a decrease in job satisfaction and remains relatively low for the next few years. Employee satisfaction level increases again as the years of employment increases as they tend to adjust to work values and the work environment adding to greater job satisfaction.

After adjusting for confounding, perceived job dissatisfaction was found to be a significant correlate of iso-strain in middle level managers (OR= 7.8; 95%CI 3.6-16.8), while perceived job insecurity (OR=2.7; 95%CI 1.65-4.4), perceived lack of opportunity for promotions (OR=3.5; 95%CI 1.95- 6.2) and perceived job dissatisfaction (OR=1.9; 95%CI 1.1-3.3) were found to be significant correlates of iso-strain in operational staff members.

Similarly, perceived job dissatisfaction became a significant correlate of high job strain in middle level managers (OR=3.3; 95%CI 1.8-5.9) while perceived job insecurity (OR=2.0; 95%CI 1.3-3.1), perceived lack of opportunity for promotions (OR=1.9; 95%CI 1.2-2.9) and perceived job dissatisfaction (OR=1.6; 95% CI 1.1-2.5) were found to be significant correlates of high job strain in operational staff members.

Job insecurity was not correlated with iso-strain or high job strain in middle level managers ($p>0.05$). Middle level managers are established in their job but the operational staff employees have to strive hard to secure their job due to the demanding and highly competitive nature of their jobs. Job opportunities are less but the demand for jobs has increased with a relatively larger population of qualified youth than before. Therefore, it can be seen that perceived job insecurity, lack of promotional opportunities and job dissatisfaction in the young operational staff members have made their work highly stressful. Job insecurity has been found to be associated with high occupational stress by others (Burke 1988; Sutherland and Cooper 1988; Sauter *et al* 1992).

It is interesting to note that operational staff members with iso-strain have a higher correlation with the career development variables than the operational staff members with high job strain. It can be seen that workers with low social support at work are more prone to report perceived lack of opportunities for promotions, job insecurity and be dissatisfied with their jobs rather than workers with high social support at work.

Some of the correlates of iso-strain that were found to be significant in the bivariate analysis were not found to be significant in the regression models among the two study populations. It was found that perceived inability of coping with work stress ($p<0.001$), perceived job insecurity ($p<0.001$), lack of opportunity for promotions ($p<0.001$), lack of job satisfaction ($p=0.03$), perceived anger due to work related problems at home ($p=0.01$) and service of ten years or less in the currently working bank (0.001) were significant correlates of iso-strain among operational staff members at 0.05 significance level in the regression model.

However, among the middle level managers only perceived job dissatisfaction ($p<0.001$) and taking office work home ($p=0.009$) were significant correlates of iso-strain at 0.05 significance level in the regression model.

Perceived inability to cope with work stress ($p<0.001$), perceived job insecurity ($p=0.002$), perceived lack of opportunities for promotions ($p=0.006$), job dissatisfaction ($p=0.04$), perceived anger due to work related problems at home ($p=0.002$), perceived delays in data processing ($p=0.049$), age of the operational staff member ($p=0.009$) and the marital status ($p=0.048$) were found to be significant correlates of high job strain among operational staff members at 0.05 level of significance in the regression model.

Many of the correlates significantly associated with both high job strain and iso-strain were similar among operational staff members in the present study. These were: perceived inability to cope with work stress, perceived job insecurity, perceived lack of opportunities for promotions, job dissatisfaction and perceived anger due to work related problems at home. In addition, age less than 35 years, being currently unmarried and perceived delays in data processing was found to be significant correlates for high job strain among operational staff members.

The narrow confidence intervals observed for the magnitude (prevalence and proportions) of iso-strain and high job strain variables addressed in this component of the study is a reflection of the precision of the study. A high precision was achieved due to reduced random errors which were taken care of by the increase in the sample size. Adequacy of sample size for the determination of correlates can be assessed by looking at the 95% confidence intervals which were quite narrow and the number of factors that became significant in the bivariate analysis.

Internal validity of this component of the study is dependent on the degree of confounding exerted by factors that are associated both with exposure and outcome status. This was controlled for by the application of multivariate analysis. Four multivariate logistic models were used to control the effects of confounding in identifying correlates for iso-strain and high job strain among middle level managers and operational staff members. In addition validity of self-reporting too can affect the internal validity of this study since occupational stress has been subjectively assessed and this has been discussed in detail in section 5.2 of the discussion chapter.

This study was carried out in domestic commercial banks in the district of Colombo. Thus prevalence estimates in this study may not be generalized to the entire population of banking workers of Sri Lanka and the external validity of the study has been discussed in section 5.1 of the discussion chapter.

Assessment of correlates was done considering a limited number of variables due to feasibility reasons. Each correlate was assessed by using only one item in the correlate

questionnaire. Some correlates could have been assessed in more detail using standardized questionnaires with more than one item. This was not possible due to the nature of work carried out by the study populations since it was not feasible to administer lengthy questionnaires due to time constraints. Yet, it can be concluded that the results have been helpful to identify correlates of iso-strain and high job strain among the study populations considering the number of variables which became significant ($p<0.05$) in the bivariate as well as in multivariate analysis. The results of this study could be used to carry out detailed studies on this aspect in the future. Due to the cross-sectional nature of this component, the cause and effect relationship between the parameters could not be established. However demonstrating that there is a linkage will help focus on correlates that might merit closer attention in longitudinal studies. It will also be useful to the administrators of banks and occupational health workers in planning their activities for the betterment of the bank workers.

5.5 The occupational stress management intervention

The objective of the third component of the study was to plan, develop, implement and assess the effectiveness of an occupational stress management intervention conducted for middle level managers of domestic commercial banks in the Colombo district. It was a cluster randomized controlled study with pre and post intervention comparisons on study and control groups after the implementation of the stress management intervention for the study group.

The study was carried out among middle level managers working in four randomly selected domestic commercial banks in the Colombo district. Two banks were selected as the study group while the other two were included in the control group. All the branches of the study and control group banks in the Colombo district were listed indicating the number of eligible middle level managers in each branch. It was decided to select all eligible and consenting middle level managers in a particular cluster and it gave rise unequal sized clusters. The average cluster size was taken as two and it was decided to select 45 clusters from each arm. The clusters of the study and control banks were randomly identified.

An experimental design was adopted in the study as it is considered that this provides the strongest evidence of effectiveness of an outcome of an intervention. The absence of an adequate control group can generate very misleading results. In two randomized intervention studies reviewed by Loevinsohn (1990), it was found that there was a substantial change even in the control group from before to after intervention. Whether due to a seasonal variation, the Hawthorn effect (i.e. the effect of being watched or unusual attention being paid) or due to other reasons, the control groups in these two studies have experienced dramatic improvements. Taking an adequate control helped the PI to interpret the results more meaningfully and accurately.

Hennekens and Buring (1987) state that randomization is an important step in carrying out an experimental study. By randomization, it is possible to group the subjects into study and control groups that would be as similar as possible in their baseline characteristics. A control group is defined as a group consisting of subjects who are as similar as possible to those in the study group and who are measured at the same time as the study group, but who are not subjects of the intervention (Taylor *et al* 1978).

In the ideal situation the control group should be identical to the study group in every way. Even though this cannot be achieved in a practical setting Taylor *et al* (1978) state that they can be made as similar as possible by taking a true control group. A true

control group is one formed by random assignment. The authors describe that randomization is the way to make an equivalent or true control group.

In this study, this was achieved by adopting cluster randomization instead of simple randomization. In cluster randomization, instead of individuals, groups of subjects are randomly assigned as a whole to either the intervention or control (Hauck *et al* 1991). In cluster randomization although the clusters are randomized, the analysis could be done at the level of the individual.

The potential for contamination effects of the intervention among members of the control group was minimized by implementing the intervention in a group or cluster of study subjects who were occupationally, administratively, physically and geographically located together in close proximity. The two groups were also located physically in different branches of different banks to minimize contamination effects. Randomization by cluster helped to improve the feasibility of the study. It was more feasible to implement the intervention among all middle level managers of a chosen branch rather than selecting a few from one branch for the intervention while the rest from the same branch served as the controls. Further, it was decided that selecting all participants from a particular branch and exposing them to the stress management intervention is ethically more acceptable than selecting a few members from the same cluster, for the stress management intervention while others were not subjected to the intervention. Hauck *et al* (1991) were of the view that although cluster randomization seems to be desirable there are certain disadvantages and the most important of these is the loss of efficiency particularly in terms of the effective sample size.

The intra cluster correlation is a measure of the extent to which subjects in a group are more or less like each other or homogeneous in comparison with members from other groups. The average number of individuals per cluster also determines the sample size. Both these factors were taken into consideration in the calculation of sample size in the present study. The formula that was used, recommended by Eldridge *et al* (2006) consisted of an adjustment for these factors.

The range of intra cluster correlation roh (Þ) one might expect to observe is not generally well known. Hauck *et al* (1991) suggest that for non-familial clusters it will tend to be small in the order of 0.01-0.05. Donner *et al* (1981) state that in most biologic and epidemiological applications the value of roh tends to be less than 0.6. Bennet *et al* (1991) are of the view that in practice, values greater than 0.4 are uncommon except for variables that are specific to the locality. De Silva (2007) has used 0.03 as the intra cluster correlation in his study on burnout among teachers in the Southern province of Sri Lanka. Since burnout and occupational stress are results of impaired mental health status and more or less similar concepts roh, was taken as 0.03.

In the assessment of the outcome of an intervention it is necessary to identify the comparability of the study and the control groups as far as the basic socio-demographic and service data are concerned (Taylor 1978). A self-administered questionnaire was used to collect the basic socio-demographic and service data. The outcome assessment tools (the selected and validated scales of the JCQ and GHQ 30) too were self-administered questionnaires. In a self-administered questionnaire the respondent reads the questions and fills the answers by him or herself. In this situation self administered questionnaires were used because it was simpler, cheaper feasible since all respondents were having a good level of education. Middle level managers of banks are extremely busy and the compliance would have dropped if data collection was time consuming by

way of interviewer administered questionnaires. One disadvantage of a self administered questionnaire is that all questions may not be answered by all respondents. The middle level managers were given clear instructions to fill all the questions and it was observed that it was not a problem in the present study.

Interventions designed to reduce occupational stress can be categorized according to focus, content, method and duration (van der Klink *et al* 2001). With regard to focus, interventions can be categorized as aiming to increase individual psychological resources and responses or aiming to change the occupational context by way of job redesigning. According to Pelletier *et al* (1999) ideally any occupational stress management intervention would directly modify the external environment or the "demand" side of the job strain equation. However, the external demands not only multiply but often cannot be changed because of worksite policies or procedures. Further, employers are quite resistant, at least for research purposes to allow changes in the demand or the organizational characteristics of job strain. Therefore, enhancing employee capacity and capability to respond to strain is more feasible. The two occupational stress management studies done by Stanford (1998) have focused on the internal adaptive response to enhance the autonomy of workers in the study conducted among banking employees in a major bank in the US.

Agus *et al* (2002) state that there are two main approaches to stress management at work. The first approach focuses on the modification of stressors whereas the second approach is to enhance the individual stress coping mechanisms (Bellarosa and Chen 1997). According to another classification the interventions may focus on the individual, the organization or the individual and the organizational interface. Most stress interventions, however, focus on changing the worker instead of the work environment (Semmer 2003).

Due to globalization and changes in the nature of work, people in developing countries have to deal with increasing work-related stress. In industrialized countries people are becoming more familiar with what work-related stress is and how to manage it (WHO 2005; WHO 2003). However, in developing countries, this may not yet be the case. The subject of occupational stress management in the banking sector is new to Sri Lanka. Therefore, rather than job redesign interventions, it was decided to focus on individual stress management intervention in the present study. According to Van der Klink *et al* (2001) stress reducing interventions appeared to be effective for populations at high level of job control, in contrast to workers at low level of job control. This may be also be explained by the fact that employees profit most when they are provided with individual coping skills in a job that allows them to exercise those skills. The middle level managers had more job control than the operational staff members and in addition managerial categories have been identified traditionally as being more at risk of occupational stress. Hence it was decided to select middle level managers for the intervention in the present study.

Van der Klink *et al* (2001) described four types of interventions according to categorizations used in previous reviews. Those were identified as cognitive behavioural approaches, relaxation techniques, multimodal interventions and organizational level interventions. Van der Hek and Plomp (1997) in their review on occupational stress management programmes, reported that in spite of the differences in individual level interventions, the programme structures are comparable. They reported that most of the programmes usually commence with an educational phase, in which the participants learn about the causes and consequences of occupational stress. Subsequently a cognitive skill component is included such as cognitive coping skills or

time management which is intended to change the way in which workers structure and organize their working situation. Finally relaxation and or meditation techniques are included.

Pelletier *et al* (1999) designed a telephone and mail based intervention for banking employees in a major bank in the US. They designed the occupational stress management intervention based on social cognitive learning theory. Based on this theory effective behavioural changes occur in incremental steps, starting with the acquisition of new knowledge and leading ultimately to actual behaviour change. They developed eight modules for the intervention which proceeded from basic education to a focus on behavioural strategies aimed at increasing self efficacy and finally to behaviour change. Agus *et al* (2002) in their study on nurses used stress education by way of a 90 minute lecture followed by 30- 60 minute stress practical training and a stress motivation letter.

The occupational stress management programme for the middle level managers was designed considering all these factors. Middle level managers are extremely busy and the intervention could not be very time consuming. Sims (1997) have highlighted that the length of the intervention has to be considered in terms of feasibility. It was decided to design an intervention with an initial educational phase and a workshop based practical session to teach stress management techniques. It was decided to design seven self learning modules for the educational phase of the study covering the definition, symptoms, causes and effects of occupational stress and how workers can cope occupational stress by changing their thinking, behaviour and life style. Relaxation techniques were taught in a practical session of three hours.

Van der Hek and Plomp (1997) comment that despite the similarity in structure immense differences are observed with respect to group size (6-27), duration of the programme (4-24 hours) and the period of implementation (half a day to 12 weeks). In this study the self learning modules were distributed weekly over a period of seven weeks. The duration of the stress management workshop was three hours and this was followed one week after the distribution of the last module. Twenty five middle level managers participated in a workshop and four such workshops were held in two consecutive weeks until the total members of the study group were trained. The total duration of the intervention for the whole study group was carried out over a period of nine weeks.

Self-learning modules were designed and used for the occupational stress management intervention in the present study. This method was selected since it suited an occupational group like middle level managers in a bank with high workloads who typically would not participate in more structured, time consuming stress management workshops. On the other hand, middle level managers as adult learners are adapted to reading and interpreting material on their own. Hot and Delmar (2006) used a mailed intervention for an occupational stress management programme for general practitioners since they had high workloads.

The PI identified the topics for the stress management intervention with the facilitation of experts. The PI had interpersonal discussions with each member about relevance, feasibility, applicability and ethical applicability of the topics. This provided useful means of aggregating individual judgments. In the first part of the intervention, the self-learning modules acted as the trainer. It was a designed trainer. In preparing the self-learning modules, steps were taken carefully to include all the good characteristics of a

trainer while minimizing the negative features as much as possible. Each self-learning module contained the learning objectives, content and a few review questions at the back. These review questions based on the content of the module, were used to check whether the material had been read and compliance was good.

The self-learning modules that were prepared by the PI were subjected to field testing with ten middle level managers of Gampaha district. The shortcomings of the modules found in the field testing were rectified and the final drafts were prepared. Contamination of either study or control group could have altered the results of the intervention leading to erroneous interpretations. The field testing was carried out in a different district in order to minimize the contamination effect on the middle level managers of study and control groups.

The PI played the major role in conducting the pre-intervention assessments which followed the implementation. The pre-intern doctors were trained as field assistants to assist the PI with the data collection. The pre-intern medical doctors were trained to carry out the intervention. The pre-intervention assessment was carried out in both the study and control areas simultaneously. The implementation of the intervention was carried out only in the study areas.

Compliance is one of the key issues in an experimental study. Compliance of the participants of the study group was assessed by going through the answers to the questions given at the end of each self-learning module before the participants were given the next self-learning module a week after. In addition the modules were looked for underlying, scribbling and other marks and comments on the pages of the modules. It was observed that the middle level managers complied well with the self-learning modules. The stress management workshop was arranged through the human resource and the training centers of the study group domestic commercial banks. The study group banks allocated three hours from their routine banking hours and provided the respective training centers to conduct the workshop. Two similar workshops were done for each bank in the study group. All these factors increased the participation of the middle level managers at the stress management practical workshop. The compliance for the intervention package was measured using self reports at the end of six months after the implementation of the intervention. Seventy percent of the study subjects reported that they complied with the intervention but caution has to be exercised since the information has been collected as self-reports.

The study instruments were used for two main purposes in this study. Some of the instruments were designed to assess the effectiveness of the intervention. They consisted of the three selected and validated scales of he JCQ and the GHQ 30. Secondly a self-administered questionnaire was utilized to collect basic socio-demographic and service information of the middle level managers. This was essential to compare the characteristics between study and the control group. The socio-demographic and service data of the two groups collected by the self-administered questionnaire were compared using the chi square and t test. The analysis of the results showed that the baseline socio-demographic and service characteristics were not significantly different between the study and the control groups and it showed that the two groups were comparable.

The outcome was measured using two instruments. The selected scales of the JCQ were used to assess the occupational stress and the GHQ 30 was used to assess the psychological distress in the two groups. During the pre-intervention assessment, 14

middle level managers (15.2%) belonged to the iso-strain category in the study group while nine middle level managers (10%) belonged to the iso-strain category in the control group. After the post intervention assessment of the intervention the middle level managers in the iso-strain category declined to 12 (13.5%). In the control group the post interventional iso-strain was 9.1(8%). Prevalence of iso-strain has reduced in both the study and the control groups but a statistically significant difference could not be observed at pre and post assessments in either the study or the control groups ($p>0.05$). In the present study, 26 middle level managers (28.3%) had psychological distress while 23 middle level managers (25.6%) in the control group had high psychological distress at the pre-intervention assessment. At the post intervention assessment 18 middle level managers (20.2%) had psychological distress in the study group, while 21 (23.9%) middle level managers had psychological distress in the control group. The prevalence of psychological distress in the study group has decreased by 8.1% from 28.3% to 20.2% during the pre and post assessment period ($p=0.2$). The decline in psychological distress in the control group was 1.7% from 25.6% to 23.9% ($p=0.7$).

A statistically significant difference could not be found in the change in the number of middle level managers with iso-strain or psychological distress at pre and post-interventional assessment period in the present study ($p>0.05$). The degree of reduction in iso-strain as well as psychological distress was higher in the study group compared to the control group, yet the changes were not statistically significant ($p>0.05$).

Several reviews have been conducted on interventions designed to reduce occupational stress (Murphy 1996; Murphy 1984; Newman and Beehr 1979; Ivancevich *et al* 1988). The general finding of these reviews is that such interventions were effective. However the reviews have been qualitative in nature and thus provide limited information on which type of intervention is most effective and for whom. Van der Klink *et al* (2001) stated that in concordance with earlier qualitative reviews, the meta analysis they have done provided reliable evidence that employees benefit from stress reducing interventions at the work place. Although small according to Cohen's criteria a significant effect size was found across 48 studies representing 3736 participants. The analysis clearly demonstrated that individual level interventions were more effective than organizational focused interventions. Van der Hek and Plomp (1997) in their review on stress management interventions stated that though most studies show some kind of effect, they could not find a consistent overall picture and that studies had produced differential effects.

It is important to assess the strengths and weaknesses of the present intervention study. The sample size for the present study was calculated taking the prevalence of psychological distress in the middle level managers as 30%. However the prevalence of psychological distress among middle level managers in the study and the control groups were 28.3% & and 25.6%. Therefore the sample size was adequate to measure a significant difference for the outcome psychological distress with the power specifications mentioned in the methodology section of the present study. However, the prevalence of iso-strain was 15.2% and 10% in the study and control groups respectively and therefore the sample size was not adequate to find out a statistically significant difference for the outcome iso-strain, if there was a difference.

Sims (1997) stated that a randomized controlled trial is needed to scientifically test whether any observed improvement is solely due to the intervention and a suitable control group is needed to offset the Hawthorne effect. The present intervention was

designed with these features. However Reynold and Briner (1994) have stated that caution should be exercised against using psychotherapies in non patient populations. Programme participants were apparently healthy which does not necessarily equate to their need for assistance. They also claimed that the use of essentially healthy workers can dilute the impact of an intervention.

Thus, even though the intervention could have been conducted for employees with higher level of baseline stress levels, according to Van der Klink *et al* (2001) interventions conducted with employees at high level of baseline stress appear to be at least as effective as interventions conducted with employees at low level of baseline stress levels. However only four studies involved participant selection with regard to high baseline stress levels. Long (1988) demonstrated that high anxiety scores at inclusion in the programme resulted in greater effectiveness in the outcome parameters. Therefore targeting of those individual workers most at risk would have been more effective.

Any intervention needs to clarify its aims and objectives and to seek means to achieve these and modes of assessing outcomes. The chief aim of individually focused stress management interventions must be to equip individuals with information and skill that will help them to cope more effectively with the stressors at work. According to Sims (1997) there is much empirical evidence to suggest that stress management has potential benefits although comparatively few studies have chosen outcomes to reflect the goals of the interventions. Most have used self-report measures to assess outcomes. According to Frese and Zapf (1988); Kasl (1987); Bailey and Bhagat (1987); Murphy (1984) it is important to include observational and objective measures too. Outcome measures should be chosen to maximize effect size and stability. For example several studies on occupational stress management have chosen to reduce absenteeism as an outcome variable, but have recognized that large effects would not be expected with it.

In the present study the chosen outcomes were psychological distress and high occupational stress. It would have been more effective if more outcomes were assessed. The knowledge on occupational stress among the study and control groups would have been assessed in addition to the selected outcomes. Occupational stress was assessed in the present study by using the selected three scaled of the JCQ. Since JCQ scales focuses on the content of the job at organizational level aspects, it could be less sensitive to change as the result of an individually focused stress management intervention. Pelletier *et al* (1999) reported similar findings in their intervention study among banking employees. Van der Klink *et al* (2001) reported that there was considerable diversity in the outcome variables used in occupational stress management interventions. He stressed the importance of finding out the core dimensions of stress outcomes, which will lead to more consensus about outcomes and instruments used in occupational stress management interventions.

A randomized controlled trial involving substantially larger numbers of workers would be highly desirable to increase generalizability. Although the focus of the intervention was upon enhancing individual behavioral skills, the ideal intervention would focus on both the individual and environmental determinants of occupational stress. Ideally such an intervention would help individuals develop better coping strategies while having the job environment change to be more supportive of reducing the inappropriately excessive "demand" side of the equation. However feasibility has to be taken into consideration seriously when designing occupational stress management interventions for workers who are extremely busy having high workloads.

It is important to address the internal validity of the present study. In a cluster randomized controlled trial, selection bias is more likely to occur if subjects are not randomly selected within a cluster. It was not possible to carry out the intervention on randomly selected middle level managers within a cluster (branch) due to ethical reasons and therefore, it was decided to include all eligible and consenting middle level managers in randomly selected clusters for the study group. On the other hand, clusters for the study and control groups were selected randomly. All these minimized the selection bias in the present study. Selection bias affecting internal validity also occurs as a result of refusal to participate by the selected subjects. In the present study, the response rates at the pre intervention assessment for the study and control groups were 92% and 91.8% respectively. At the post intervention assessment, the response rates for the study and the control groups were 89% and 89.8%. Therefore, the non response rates cannot be considered large enough to interfere with the internal validity of the present study.

Double blinding in a RCT will minimize the information and reporting bias. In the present study, this was not feasible due to the nature of the intervention. However, the data entry operators were blinded to the allocation of the intervention. In addition, the middle level managers were not fully aware about the exact differences between the intervention and the control groups. Hence it is likely that observer bias and reporting bias would have minimized due to these effects.

In a RCT provided randomization is adequate, known and unknown confounding factors will be balanced between the study and the control groups to minimize their effects. The present study shows similarity between study and control groups in their baseline characteristics and other socio-demographic variables. This similarity was probably achieved due to the randomization process. It also shows that even though cluster randomization was used, the balance between the groups was satisfactory. Hence, the effects of the known and unknown confounding factors were minimized.

External validity of the study refers to the extent of generalizability of the findings to other populations. The study was conducted in four domestic commercial banks in the Colombo district. Since Colombo is the commercial capital of Sri Lanka there could be differences in the organizational climate in the Colombo district branches compared to bank branches in other districts of Sri Lanka. Therefore, the results cannot be generalized to other parts of Sri Lanka. The intervention was carried out only on middle level managers. Therefore, the results of this study cannot be generalized to operational staff members even in the Colombo district branches since their job content is totally different from middle level managers. The study had to be restricted to Colombo district due to feasibility reasons, and it can be concluded that this study has paved the way for further studies on occupational stress in other parts of the country.

7.0 Conclusions

Sinhalese version of the three selected scales of the JCQ namely decision latitude, psychological demand and social support at work were found to be valid and reliable in assessing iso-strain and high job strain among banking employees in domestic commercial banks in the Colombo district. The reliability of the psychological demand scale was lowest with 0.61.

The prevalence of occupational stress among middle level managers and operational staff members employed in domestic commercial banks in the Colombo district was assessed using the validated three selected scales of the Job Content Questionnaire.
The measures of iso-strain and high job strain in middle level managers were 10.2% (95% CI 8.1-12.3) and 17.8% (95% CI 15.1-20.5) respectively.

A sex differential was observed in the prevalence of both measures in middle level managers. Iso-strain among males was 10.5% (95% CI 8.3-12.7) compared with 9.7% (95% CI 7.6–11.6) among females, while high job strain among male and female managers were 18.3% (95% CI 15.6–21.0) and 17.2% (95% CI 14.5–19.9) respectively. These differences were not significant ($p>0.05$).

The prevalence of iso-strain among operational staff members was 14.5% (95% CI 12.1–16.9) while the prevalence of high job strain was 24.4% (95% CI 21.5–27.3).

The prevalence of iso-strain among male and female operational staff members was 15.4 % (95% CI 13.0–17.8) and 13.6% (95% CI 11.3–15.9) respectively while a slightly higher level of high job strain among both male (26.7%, 95% CI 23.7–29.7) and female operational staff members (22.4%, 95% CI 19.6–25.2) was observed. The differences among males and females for iso-strain was not statistically significant ($p>0.05$) but the difference in high job strain among male and female operational staff members were found to be statistically significant ($p=0.04$).

The prevalence of iso-strain and high job strain perceived by operational staff members was higher than the middle level managers while the difference in prevalence of iso-strain ($p=0.049$) and high job strain ($p=0.01$) both were found to be statistically significant.

After controlling for confounding in the logistic regression model at 0.05 significance level the following factors were identified as correlates of iso-strain among middle level managers and includes: taking office work home (adjusted OR 3.4; 95% CI 1.3–6.98), perceived job dissatisfaction (adjusted OR 7.76; 95% CI 3.59–16.77) and the distance from current place of residence to the place of work being 10 km or less (adjusted OR 2.3; 95% CI 1.1–4.9).

The following factors were identified as correlates of high job strain among middle level managers after controlling for confounding in the logistic regression model at 0.05 significance level and includes: taking office work home (adjusted OR 2.3; 95% CI 1.2–4.5), perceived job dissatisfaction (adjusted OR 3.3; 95% CI 1.8–5.9) and reduction of the time spent with the family (adjusted OR 5.6; 95% CI 1.3–23.9).

Younger operational staff members with ten or less years of service in the current bank were found to be more stressed with higher levels of both iso-strain and high job strain than their older counterparts.

Among operational staff members the factors identified as significant correlates of iso-strain after controlling for confounding in the logistic regression model at 0.05 significance level were: perceived anger due to work related problems at home (Adjusted OR 1.8; 95% CI 1.1–2.9), perceived job insecurity (Adjusted OR 2.7; 95% CI 1.7–4.4), perceived lack of opportunity for promotions (Adjusted OR 3.5; 95% CI 1.9–6.2), perceived job dissatisfaction (Adjusted OR 1.9; 95% CI 1.1–3.3), perceived inability of coping work stress (Adjusted OR 3.0; 95% CI 1.8–4.9) and service of ten years or less in the currently working bank (Adjusted OR 2.5; 95% CI 1.5-4.2).

Among operational staff members, the factors identified as significant correlates of high job strain after controlling for confounding in the logistic regression model at 0.05 significance level were: perceived anger due to work related problems at home (Adjusted OR 1.8; 95% CI 1.2–2.7), perceived job insecurity (Adjusted OR 2.0; 95% CI 1.3-3.1), perceived lack of opportunity for promotions (Adjusted OR 1.9; 95% CI 1.2–2.9), perceived job dissatisfaction (Adjusted OR 1.6; 95% CI 1.03–2.5), perceived inability of coping work stress (Adjusted OR 2.0; 95% CI 1.4–3.0), perceived delays in data processing (Adjusted OR 1.5; 95% CI 1.002 – 2.1), age less than 35 years (Adjusted OR 1.9; 95% CI 1.2–3.3) and being unmarried (Adjusted OR 1.5; 95% CI 1.003–2.3).

The individual level occupational stress management intervention conducted for the middle level managers was not found to be effective ($p>0.05$) though the level of psychological distress and the iso-strain have decreased at the post-intervention assessment in the study group more than the control group.

References

Abramson, J. H., & Abramson, Z. H., 1999, *Survey methods in community medicine*, 5th edition, London, Churchil Livingstone. 171-205.

Agus, S. M. B., Noor Hassim, I., Jefferelli, S. B., 2002, Stress intervention among health nursing in two health districts in Teregganu Malasia, internet.

Anderson, E. A., & Leslie, L. A., 1991, Coping with employment and family stress: Employment arrangement and gender differences, *Sex Roles*, 24, 223-231.

Arthur, A., 2005, When stress is a mental illness: a study of anxiety and depression in employees who use occupational stress counseling schemes, *Stress and Health*, 21, 273-280.

Australian Council of Trade Unions, 1998, *A Report of the ACTU 1997 National OHS Survey on Stress at Work, Melbourne*: ACTU Occupational Health & Safety Unit.

Beaton, R., Murphy, S., & Pike, K., 1992, *Symptoms of stress in male and female firefighters/paramedics,* In Proceedings of the *National Institute of Occupational Safety & Health Conference - Stress in the 90s: A Changing Workforce in a Changing Workplace, Washington*: NIOSH.

Beck, A., 1984, *Cognitive Approaches to Stress, Principles and Practices of Stress Management*, 91-110.

Beehr, T. A., 1995, *Psychological stress in the workplace*, London: Routledge.

Beehr, T. A., & Newman, J. E., 1978, Job stress, employee health and organizational effectiveness: A facet analysis, model and literature review, *Personnel Psychology,* 31, 665-699.

Beehr, T.A., Walsh, J.T., & Taber, T.D., 1976, Perceived situational moderators of the relationship between subjective role ambiguity and role strain, *Journal of Applied Psychology*, 61, 35-40.

Bellarosa, C., & Chen,P., Y., 1997, The effectiveness and practicality of occupational stress management interventions: a survey of subject matter expert opinion, *Journal of Occupational Health Psychology,* 5(1), 156-163.

Bennett, S., Woods, T., Liyanage, W. M., Smith, D. L., 1991, A simplified general method for cluster sample surveys of health, *World Health Statistics Quarterly*, 44, 98-106.

Bhagat, R. S., Allie, S. M., & Ford, J. D. L., 1995, Coping with stressful life events: An empirical analysis. In R. Crandall & P. L. Perrewé (Eds.), *Occupational stress. A handbook* (pp. 93-112). Washington: Taylor & Francis.

Bland, J. M., & Altman, D.G., 1986, Statistical methods for assessing agreement between two methods of clinical measurement, *Lancet,* 1, 307-331.

Blumenthal, J. A., Thyrum, E. T., Siegal, W. C,.1995, Contribution of job strain, job status and marital status to laboratory and ambulatory blood pressure in patients with mild hypertension, *J Psychosom Res* Feb, 39(2), 133-44.

Bond, R., & Bunce, D., 2001, Job control mediates change in a work reorganization intervention for stress reduction, *Journal of Occupational Psychology*,6, 290-3-2.

Bond, F. W., & Bunce, D., 2000, Mediators of change in emotion focused and problem focused worksite stress management interventions, *Journal of Occupational Health Psychology*,6, 290-3-2.

Bosma, H., Marmot, M. G., Hemingway, H., Nicholson, A. C., Brunner, E., & Stansfeld, S. A., 1997, Low job control and risk of coronary heart disease in Whitehall II (prospective cohort) study, *British Medical Journal, 314*, 558-565.

Bosma, H., Peter, R., Siegrist, J., & Marmot, M. G., 1998, Two alternative job stress models and the risk of coronary heart disease, *American Journal of Public Health, 88*, 68-74.

Brief, A.P., Burke, M.J. & George, J.M., 1988, Should negative affectivity remain an unmeasured variable in the study of stress?, *Journal of Applied Psychology*, 73,193-198.

Brief, A.P., Burke, M.J., George, J.M., Robinson, B.S., & Webster, J., 1983, Should negative affectivity remain an unmeasured variable in the study of job stress?, *Journal of Applied Psychology,* 73, 193-199.

Brief, A. P., & George, J. M., 1991, Psychological stress in the workplace: A brief comment on Lazarus' outlook. In P. L.Perrwé (Ed.), *Handbook on job stress* (pp. 15-20). Corte Madera, CA: Select Press.

Buck, C., & Donner, A., 1982, The design of controlled experiments in the evaluation of non therapeutic interventions, *Journal of Chronic diseases*, 35, 531- 538.

Burke, R. J., 1996, Stress, satisfaction and militancy among Canadian physicians: a longitudinal investigation, *Soc Sci Med,* 43, 517-24.

Cannon, W., 1914, The interrelations of emotions as suggested by recent physiological researches, *American Journal of Psychology, 25*, 256-282.

Cannon, W., 1929, *Bodily changes in pain, hunger, fear, and rage*. Boston, MA: C.T. Branford Company.

Cartwright, S., & Cooper, C. L., 1997, *Managing workplace stress*. Thousand Oaks, CA: Sage.

Cartwright, S., Cooper, C.L., & Murphy, L., 1995, Diagnosing a healthy organisation: A proactive approach to stress in the workplace, In L Murphy & J. Hurrell & S. Sauter & G Keita (Eds.), *Job Stress Interventions.* Washington, DC: American Psychological Association.

Cascio, W.F., 1995, Wither industrial and organisational psychology in a changing world?, *American Psychologist,* 50, 928-939.

Caulfield, N., Chang, D., Dollard, M. F., Elshaug, C., 2004, A review of occupational stress interventions in Australia, *International Journal of Stress Management,* 11, 149-166.

Cedillo B.L., & Grijalva, M. G., 2005, Trends in the Employment Market in Hermosillo - Sonora, Mexico and Analysis of Psychosocial Risk Factors. Oral presentation. 4th ICOH Conference on Work environment and Cardiovascular Disease. Abstract 093, Newport Beach, California.

Central Bank of Sri Lanka, 2007, *Annual Report,* Colombo, Central Bank of Sri Lanka.

Chan, K.B., Lai, G., Ko, Y.C., & Boey, K.W., 2000, Work stress among six professional groups: The Singapore experience, *Social Science and Medicine,* 50, 1415-1432.

Chandraiah, K., Ageawal, S. C., Marimuttu, P., & Manoharan, N., 2003, Occupational stress

and job satisfaction among managers, *Indian Journal of Occupational & Environmental medicine,* 7(2), 6-11.

Chang, S. J., 2000, Trends and future directions of job stress in Korea, In: The 1st East-Asia Job stress meeting, Tokyo, Japan.

Cheng, Y., Kawachi, I., Coakley, E. H., Schwartz, J., & Colditz, G., 2000, Association between psychosocial work characteristics and health functioning in American women: Prospective study, *British Medical Journal,* 320, 1432-1436.

Cheng, Y., Luh, W. M., & Guo, Y. L., 2003, Reliability and validity of the Chinese version of the Job Content Questionnaire in Taiwanese workers, *International Journal of Behavioural Medicine*, 10, 15-30.

Cheng, Y., Guo, Y. U., & Yeh, W. Y., 2001, A national survey of psychosocial job stressors and their implications for health among working people in Thaiwan, *International Archives of Occupational and Environmental Health,* 74, 495-504.

Cherrington, D.J., Condie, S.J., England, J.L., 1979, Age and work values, *Academy of Management Journal*, 22.

Clays, E., 2007, Psychosocial job stress in relation to health, PhD Thesis, Ghent University.

Cohen, S., 2004, Social relationships and health, *American Psychologist,* 59, 676-684.

Cooper, C. L., 1986, Job distress: Recent research and the emerging role of the clinical occupational psychologist, *Bulletin of the British Psychological Society,* 39, 325-331.

Cooper, C. L., 1987, The experience and management of stress: Job and organizational determinants. In A. W. Riley & S. J. Zaccaro (Eds.), *Occupational stress and organizational effectiveness* (pp. 53-69). New York: Praeger.

Cooper, C.L., 1991, Stress in organisations, In M. Smith (Ed). *Analysing Organisational Behaviour.* London: MacMillan.

Cooper, C. L., & Cartwright, S., 1994, Healthy mind: Healthy organization - a proactive approach to occupational stress, *Human Relations,* 47, 455-470.

Cooper, C. L., & Dewe, P. J., 2004, *Stress: A brief history.* Oxford: Blackwell Publishing.

Cooper, C. L., Dewe, P. J., & Driscoll, M. P., 2001, *Organizational stress: A review and critique of theory, research and applications*. Thousand Oaks, CA: Sage.

Cooper, C.L., & Payne, R., 1988, *Causes, coping and consequences of stress at Work,* New York: Wiley.

Cornfield, J., 1978, Randomization by group: a formal analysis, *American Journal of Epidemiology*, 108, 100-102.

Cotton, P., 1996, The prevention and management of psychological dysfunction in occupational settings, In P. Cotton & H. Jackson (Eds.). *Early Intervention and Prevention Mental Health,* 247- 283.

Cotton, P., & Fisher, B., 1995, Current issues and directions for the management of workplace psychological health issues, In P. Cotton (Ed.). *Psychological Health in the Workplace* (pp. 267-278), Melbourne: The Australian Psychological Society.

Cox, T., 1978, *Stress*. London: MacMillan.

Cox, T., 1993, Stress Research and Stress Management: Putting Theory to Work, Sudbury: HSE Books.

Cox, T., Griffiths, A. & Rial-Gonzalez, E., 2000, Research on Work-related Stress, Luxembourg: Office for Official Publications of the European Communities.

Cox, T. & Mackay, C., 1985, The measurement of self-reported stress and arousal, *British Journal of Psychology*. 76, 183-186.

Cronbach, L. J., 1951, Coefficient alpha and the internal structure of tests, *Psychometrica,* 16, 297.

Dawis, R. V., & Lofquist, L. H., 1984, *A psychological theory of work adjustment.* Minneapolis: University of Minnesota Press.

Day, A. L., & Livingstone, H. A., 2001, Chronic and acute stressors among military personnel: Do coping styles buffer their negative impact on health, *Journal of Occupational Health Psychology,* 6,348-360.

De Frank, R. S., 1988, Psychometric measurement of occupational stress: Current concerns and future directions. In J. J. Hurrell, L. R. Murphy, S. L. Santer & C. L. Cooper (Eds.), *Occupational stress: Issues and developments in research* (pp. 54-65). New York: Taylor & Francis

de Jonge, J., Bosma, H., Peter, R., & Siegrist, J., 2000, Job strain, effort reward imbalance and employee well-being: A large-scale cross sectional study, *Social Science & Medicine,* 50, 1317-1327.

de Jonge, J., & Kompier, M. A. J., 1997, A critical examination of the demand-control-support model from a work psychological perspective, *International Journal of Stress Management,* 4, 235-258.

de Lange, A. H., Taris, T. W., Kompier, M. A. J., Houtman, I. L. D., & Bongers, P. M ., 2003, "The very best of the millennium": Longitudinal research and the demand-control-(support) model, *Journal of Occupational Health Psychology,* 8, 282-305.

Department of Labour, State of New Jersey, 1988, *Employment projections. Volume II: Occupational outlook for New Jersey and selected areas 1986-2000,* Trenton, NJ: Department of Labour.

De Raeve, L., Jansen, N. W. H., & Kant, I., 2007, Health effects of transitions in work schedule, work hours and overtime in a prospective cohort study, *Scandinavian Journal of Work, Environment & Health,* 33, 105-113.

Derogatis, L. R., & Coons, H. L., 1993, Self-report measures of stress. In L. Goldberger & S. Breznitz (Eds.), Handbook of stress: Theoretical and clinical aspects (2nd Edition) (pp. 200-233). New York: The Free Press.

De Silva, P, V., 2007, Occupational health problems, life style and occupational risk factors associated with burnout among female primary school teachers in the Southern Province of Sri Lanka, MD Thesis in Community Medicine, Post Graduate Institute of Medicine, University of Colombo.

Dewe, P.J., 1989, "Examining the nature of work stress: Individual evaluations of stressful experiences and coping", *Journal of Human relations*, 42(11), 993-1013.

Dewe, P. J., Cox, T., & Ferguson, E., 1993, Individual strategies for coping with stress at work: A review, *Work & Stress,* 7, 5-15.

Diamond, C.T.P., 1990, Reducing managerial stress through focusing Dependencies, *Asia Pacific Human Resource Management,* 76-81.

Dileepkumar, M., 2006, A study on job stress of Nationalized and non nationalized bank employees, Source E mail.

Dimartino, V., 1992, Occupational stress: A preventive approach. In: ILO, Preventing stress at work, Conditions of work digest, V11, 2, 3-21.

Doby, V. J., & Caplan, R. D., 1995, Organizational stress as threat to reputation: Effects on anxiety at work and at home, *Academy of Management Journal,* 38, 1105- 1123.

Dollard, M., 1996, *Work Stress: Conceptualisations and Implications for Research Methodology and Workplace Intervention,* University of South Australia: Work and Stress Research Group

Dollard, M. F., Winefeild, H. R., & de Jonge, J., 2000, Psychosocial job strain and productivity in human service workers: A test of the demand-control-support model, *Journal of Occupational and Organizational Psychology,* 73, 501-510

Donner, A., 1982, An empirical study of cluster randomization, *International Jouranal of Epidemiology*, 11, 283- 286.

Donner, A., Birkett, N., & Buck, C., 1982, Randomization by cluster: sample size requirements and nanlysis, *American Journal of Epidemiology*, 114(6), 906-914.

Donner, A., & Donald, A., 1987, The analysis of data arising from a stratified design with the cluster as the usit of randomization, *Statistics in Medicine*, 6, 43-52.

Donner, A., & Donald, A., 1988, The statistical analysis of multiple binary measurements, *Journal of Clinical Epidemiology*, 41, 899- 905.

Doublet, S., 2000, *The stress myth.* Sydney: IPSILON Publishing.

Douglas, M., & Bain, C., 1996, Organisational strategies for the prevention and management of occupational stress in the public sector: The Queensland public sector occupational stress initiative. In Proceedings of the *National Occupational Stress Conference,* Brisbane: Australian Psychological Society.

Dua, J. K., 1994, Job stressors and their effects on physical health, emotional health, and job satisfaction in a university, *Journal of Educational Administration*, 32(1), 59-78.

Dyer, S., & Quine, L., 1998, Predictors of job satisfaction and burnout among the direct care staff of a community learning disability service, *Journal of Applied Research in Intellectual Disabilities,* 11(4), 320-332.

Edimansyah, B. A., Rusli, B. N., Naing, L., Muzalisah, M., 2006, Reliability and construct validityof the Malay version of the Job Content Questionnaire JCQ), *Southeast Asian J Trop Med Public Health,* 37(2), 412-416

Ellis, N., 1962, *Organisational Strategies: The Organisational Approach to Stress Management: Practical Issues,* New York, Springer.

Endresen, I. M., Ellertsen, B., Endresen, C., Hjelmen, A. M., Matre, R. and Ursin, H., 1991,

Stress at Work and Psychological and Immunological Parameters in a Group of Norwegian Female Bank Employees, *Work and Stress,* 5(3), 217-227.

Encyclopedia of Management, C Heyel, 1973, Van Nostrand Reinhold Co.

Farrington, A., 1995, Stress and nursing, *British Journal of Nursing*, 4(10), 574- 578.

Fernandes, C. F. V., Kumar, S., Mekoth, N., 2009, Gender differences in stress among bank officers of private and public sectors, *The Icfai University Journal of Organizational Behaviour,*2, 15-22.

Fisher, C.D., & Gitelson, R., 1983, A meta-analysis of the correlates of role conflict and role ambiguity, *Journal of Applied Psychology,* 68, 320-333.

Fletcher, B. C., & Jones, F., 1993, A refutation of Karasek's demand discretion model of occupational stress with a range of dependent measures, *Journal of Organizational Behavior,* 14, 319-330.

Flett, R.A., Biggs, H.C., & Alpass, F., 1992, Contextual issues for vocational placement co-ordinators.: Some preliminary findings, *International Journal of Rehabilitation Research,* 16, 313-315.

Fogarty, G. J., Machin, A., Albion, M. J., Sutherland, L. F., Lalor, G. I., & Revitt, S., 1999, Predicting occupational strain and job satisfaction: The role of stress, coping, personality, and affectivity variables, *Journal of Vocational Behavior*, 54 (3), 429-452.

Folkman, S., 1997, Positive psychological states and coping with severe stress, *Social Science & Medicine,* 45, 1207-1221.

Folkman, S., Lazarus, R. S., Gruen, R., & DeLongis, A., 1986, Appraisal, coping, health and psychological symptoms, *Journal of Personality and Social Psychology,* 50, 572-579.

Fortes-Ferreira, L., Peiró, J. M., González-Morales, M. G., & Martin, I., 2006, Work-related stress and well-being: The roles of direct action coping and palliative coping, *Scandinavian Journal of Psychology,* 47, 293-302.

Fox, M. L., Dwyer, D. J., & Ganster, D. C., 1993, Effects of stressful job demands and control on physiological and attitudinal outcomes in a hospital setting [Electronic version], *Academy of Management Journal*, 36, 289-318.

French, J. R. P., 1973, Person role fit, *Occupational Mental Health,* 3, 15-20.

French, J. R. P., & Caplan, R. D., 1972, Organizational stress and individual strain. In A. J. Marrow (Ed.), *The failure of success* (pp.30-66). New York: Amacom.

French, J. R. P., Caplan, R. D., & Van Harrison, R., 1982, *The mechanisms of job stress and strain*. Chichester: Wiley.

Frese, M., & Zapf, D., 1988, Methodological issues in the study of work stress: Objective vs subjective measurement of work stress and the question of longitudinal studies. In C. L. Cooper & R. Payne (Eds.), *Causes, coping, and consequences of stress at work* (pp. 375-411). New York: John Wiley & Sons Ltd.

Ganster, D.C., & Schaubroeck, J., 1991, Work stress and employee health, *Journal of Management,* 17, 235-271.

Geare, A., 1989, Management stress in Australia: Its impact on stimulation and Strain, *Journal of Occupational Health Safety – Australia and New Zealand,* 5(3), 249- 255.

Ghadially, R., & Kumar, P., 1987, Stress, strain and coping styles of female professionals, *Indian Journal of Applied Psychology*, 26 (1), 1-8.

Giga, S. I., & Hoel, H., 2003, Working Paper Violence and stress at work in financial services, University of Manchester Institute of Science and Technology, United Kingdom Working papers are preliminary documents circulated to stimulate discussion and obtain comments International Labour Office, Geneva.

Glasser, M. A., 1984, Labor looks at work stress. In L. W. Krinsky, S. N. Kieffer, P. A. Carone, & S. F. Yolles (Eds.), Stress and productivity (pp. 55-64). New York, NY: Human Sciences Press, Inc.

Glazer, S., & Beehr, T. A., 2005, Consistency of implications of three role stressors across four countries, *Journal of Organizational Behavior,* 26, 467-487.

Goldberg, D., & Williams, P. A., 1988, User's Guide to the General Health Questionnaire, pp 1-5.

Greenberg, J. S., 1990, Comprehensive Stress Management (3rd ed.). Dubuque, IA: Wm. C. Brown Publishers.

Greenberg, J. S., 1999, Comprehensive stress management (6th Edition). New York: WCB/McGraw-Hill.

Guppy, A., & Gutteridge, T., 1991, Job satisfaction and occupational stress in UK general hospital nursing staff, *Work and Stress*, 4, 315-323.

Guyton, A.C., 1981, *Textbook of Medical Physiology* (6th ed.), Philadelphia:W.B.

Hackman, J. R., & Oldham, G. R., 1980, *Work redesign.* Reading: Addison-Wesley.

Harrison, R. V., 1985, The person-environment fit model and the study of job stress. In T. A. Beehr & R. S. Bhagat (Eds.), *Human stress and cognition in organizations* (pp. 23-55). New York: Wiley.

Hassan, E. M., 2009, Gender, self-concept and occupational status differentials in occupational stress among bank workers in Lagos State, *The Social Sciences* 4(2), 154-157.

Hauck, W, W., Gills, C. L., Donner, A., & Gortener, S., 1991, Randomization by cluster, *Journal of Nursing Research*, 40(6), 356- 358.

Helmer, C., Barberger-Gateau, P., Letenneur, L., & Dartigues, J. F., 1999, Subjective health and mortality in French elderly women and men, *Journals of Gerontology Series B: Psychological Sciences and Social Sciences,* 54, 84-92.

Hennekens, C. H., & Buring, J. E., 1987, 'Screening', Epidemiology in Medicine, 1st edition, Little Brown and Company, Boston, Toronto.

Herdman, M., Fox-Rushby, J., Badia, X., 1997, Equivalence and he translation and adaptation of health related quality of life questionnaires, *Quality of Life Research*, 7, 237-247.

Hobfoll, S. E., Dunahoo, C. L., Ben-Porath, Y., & Monnier, J., 1994, Gender and coping: The dual-axis model of coping, *American Journal of Community Psychology,* 22, 49-81.

Hochschild, A., 1983, *The Managed Heart, Berkley*: University of California Press.

Hodgson, J.T., Jones, J.R., Elliott, R.C., Osman, J., 1993, Self-Reported Work-Related Illness, HSE Research Paper 33, Sudbury: HSE Books. ISBN 0 7176 0607 4

Hollingworth, C., Mathews, G., Hartnett, O., 1988, Job satisfaction and mood: An exploratory Study, *Work and Stress*, 2(3).

Hsiu-Chuan, S., Cheng, Y., Perng, J. T., Su-hsing, L., Guo, Y. L., 2004, Occupational stress in nurses in Psychiatry Institutions in Taiwan, *Journal of Occupational Health*, 47, 218-225.

Hulley, S. B., & Cummings, S. R., 1988, Designing Clinical Research: An Epidemiologic Approach, Baltimore, Williams & Wilkins.

Humphrey, J.H., 1998, *Job Stress*. Needman Heights, MA: Allyn & Bacon.

Hurrell, J. J. J., Nelson, D. L., & Simmons, B. L., 1998, Measuring job stressors and strains: Where we have been, where we are, and where we need to go, *Journal of Occupational Health Psychology,* 3, 368-389.

International Labour Office, 1992, *Conditions of Work Digest: Preventing Stress at Work,* Geneva, Switzerland: International Labour Office.

International Labour Organization, Annual Report, 2001.

Ivancevich, J., Matteson, M.T., Freedman, S.M., & Phillips, J.S., 1990, Worksite stress management interventions, *American Psychologist*, 45, 252-261.

Jacobs, R.A., 1994, The invisible workforce: How to align contract and temporary workers with core organizational goals, *National Productivity Review,* Spring, 169-183.

Jian, L. I., Wenjie, Y. P., Liu, Z.X., & Sung, C., 2004, Psychometric Evaluation of the Chinese (Mainland) version of Job Content Questionnaire, A study in University Hospitals, *Industrial Health*, 42, 260-267.

Johansson, G., Cavalini, P. & Pettersson, P., 1996, Psychobiological reactions to unpredictable performance stress in a monotonous situation, *Human Performance*, 9, 363-384.

Johnson, J. V., 1986, The impact of workplace social support, job demands and work control upon cardiovascular disease in Sweden. Unpublished doctoral dissertation, John Hopkins University.

Johnson, J. V., 1989, Control, collectivity and the psychosocial work environment. In S. L. Sauter, J. J. Hurrell & C. L. Cooper (Eds.), *Job control and worker healt*h. Chichester: Wiley.

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

Johnson, J. V., Hall, E. M., & Theorell, T., 1989, Combined effects of job strain and social isolation on cardiovascular disease morbidity and mortality in a random sample of the Swedish male working population, *Scandinavian Journal of Work, Environment & Health,* 15, 271-279.

Johnson, J. V., Hall, E. M., Stewart, W., Friedland, P., & Theorell, T., 1990, Psychosocial job exposure matrix: An occupationally aggregated attribution system for work environment exposure characteristics (Stress Research Report No. 221). Stockholm: National Institute for Psychosocial Factors and Health.

Jones, B., Flynn, D., & Kelloway, E., 1995, Perception of support from the organisation in relation to work stress, satisfaction, and commitment, In S. Sauter & L. Murphy (Eds.). *Organisational Risk Factors for Job Stress,* Washington, DC: American Psychological Association.

Kahn, R. L., 1986, On the conceptualization of stress. In A. Eichler, M. M. Silverman, & D. M. Pratt (Eds.), How to define and research stress (pp. 41–43). Washington, DC: American Psychiatric Press, Inc.

Kahn, R. L., & Byosiere, P., 1992, Stress in organisations, In *Handbook of Industrial and Organisational Psychology (2nd Ed.),* 571-650.

Kalimo, R., & Vuori, J., 1991, Work factors and health: The predictive role of pre-employment experiences, *Journal of Occupational Psychology*, 64, 97-115.

Karasek, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign, *Administrative Science Quarterly,* 24, 285-307.

Kahn, R., Wolfe, D. M., Quinn, R. P., &Snoek, J. D., 1964, Organizational stress: *Studies in role conflict and ambiguity*. New York: Wiley.

Karasek, R. A., 1985, *Job content questionnaire and users' guide. Los Angeles*: University of Southern California Department of Industrial and Systems Engineering.

Karasek, R. A., 1990, lower health risk with increased job control among white collar workers, *Journal of Occupational Behaviour*, 11, 171-185.

Karasek, R. A., Triantis, K., & Chaudhry, S., 1982, Co-worker and superior support as moderators of associations between task characteristics and mental strain, *Journal of occupational behaviour*, 3, 147-160.

Karasek, R. A., 1998, Demand/Control model: A social, emotional and physiological approach to stress risk and active behavior development. In J. M. Stellman (Ed.), *Encyclopedia of occupational health and safety* (pp. 34.36-34.14). Geneva: ILO.

Karasek, R. A., Brisson, C., Kawakami, N., Houtman, I., & Bongers, P.M., 1998, The Job Content Questionnaire (JCQ): An instrument for internationally comparative assessments of psychosocial job characteristics, *Journal of Occupational Health Psychology,* 3, 322-355.

Karasek, R. A., Baker, D., Maixer, F., Ahlbom, A., & Theorell, T., 1981, Job decision latitude, job demands and cardiovascular disease: A prospective study of Swedish men, *American Journal of PublicHealth*, 71, 694-705.

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

Kasl, S. V., 1978, Epidemiological contributions to the study of work stress. In C. L. Cooper & R. L. Payne (Eds.), *Stress at work* (pp. 3-38). New York: Wiley.

Kasl, S. V., 1987a, Methodologies in stress and health: Past difficulties, present dilemmas, future directions. In S. V. Kasl & C. L. Cooper (Eds.), *Research methods in stress and health psychology* (pp. 307-318).New York: John Wiley & Sons.

Kasl, S. V., 1987b, The researcher's perspective. In J. C. Quick, R. S. Bhagat, J. E. Dalton & J. D. Quick (Eds.), *Work stress: Health care systems in the workplace* (pp. 16-20), New York: Praeger.

Kasl, S. V., 1998, Measuring job stressors and studying the health impact of the work environment: An epidemiologic commentary, *Journal of Occupational Health Psychology,* 3, 390-401.

Kawakami, N., & Haratani, T., 1999, Epidemiology of Job stress and Health in Japan: Review of current evidence and future directions, *Industrial Health,* 37, 174-186.

Kawakami, N., Haratani, T., & Araki, S., 1992, Effects of perceived job stress on depressive symptoms in blue-collar workers of an electrical factory in Japan, *Scandinavian Journal of Work, Health & Environment 18*, 195-200.

Kawakami, N., Kobayashi, F., Araki, S., Haratani, T., & Furui, H., 1995, Assessment of job stress dimensions based on the job demand-control model of employees of telecommunication and electric power companies in Japan: Reliability and validity of the Japanese version of the Job Content Questionnaire, *International Journal of Behaviouaral Medicine*, 2, 358-375.

Kawakami, N., & Fujigaki, Y., 1996, Reliability and validity of the Japanese version of Job Content Questionnaire: Replication and extension in computer company employees, *Industrial Health*, 34, 295-306.

Keilhofner, G., 1995, *A Model of Human Occupation: Theory and Application,* Chicago: Williams & Wilkins.

Keita, G., & Sauter, S., 1992, *Work and Well-being: An Agenda for the 1990s,* Washington, DC: American Psychological Association.

Keller, R.T., 1975, Role Conflict and ambiguity: Correlates with job satisfaction and values, personnel Psychology, 28(1), 102-106.

Kendall, E., Murphy, P., O'Neill, V., & Bursnall, S., 2000, Occupational stress: Factors that contribute to its occurrence and effective management, Centre for Human Services, Griffith University.

Kirby, J., 1999, Downsizing gets the push, *Business Review Weekly*, *March 22*, 50-54.

Kleinman, A. A., 1987, Anthropology and Psychiatry: The role of culture in cross cultural research on illness, *Br J Psychiatry*, 151, 447-54.

Kobasa, S., 1982, Stressful life events: personality and health: A prospective study, *Journal Pers. Soc. Psychol.* 42(1), 168-172.

Kohler, S., & Kamp, J., 1992, *American Workers under Pressure.* (Technical Report). St Paul, Minnesota: St Paul Fire and Marine Insurance Company.

Kompier, M. A., 2005, Assessing the psychosocial work environment- "subjective" versus "objective" measurement, *Scandinavian Journal of Work Environment & Health*, 31(6), 405-408.

Korunka, C., Weiss, A., Huemer, K.-H., & Karetta, B., 1995, The effects of new technologies on job satisfaction and psychosomatic complaints, *Applied Psychology: An International Review,* 44, 123-142.

Kristensen, T. S., 1995, The demand-control-support model: Methodological challenges for future research, *Stress Medicine,* 11, 17-26.

Kristensen, T. S., 1996, Job stress and cardiovascular disease: A theoretical critical review, *Journal of Occupational Health Psychology,* 1, 246-260.

LaMontagne, A. D., Louie, A., Keegal, T., Ostry, A., & Shaw, A., 2006, Workplace stress in VIctoria: Developing a systems approach. Melbourne: Victorian Health Promotion Foundation, <http:// www.vichealth.vic.gov.au/workplace stress>.

Landsbergis P. A.., Schnall P.L., Warren K., Pickering T.G., Schwartz J.E., 1994, Association between ambulatory blood pressure and alternative formulations of job strain, *Scand J Work Environ Health,* 20, 349-363.

Laungani, P., 1993, Cultural differences in stress and its management, *Stress Medicine*, 9, 37 - 43.

Lazarus, R. S., 1966, *Psychological stress and the coping process*. New York: McGraw-Hill.

Lazarus, R. S., 1977, Psychological stress and coping in adaptation and illness. In Z. J. Lipowski, D. R. Lipsitt & P. C. Whybrow (Eds.), *Psychosomatic medicine: Current trends and clinical applications* (pp.14-26). New York: Oxford University Press.

Lazarus, R. S., 1991, Psychological stress in the workplace, *Journal of Social Behavior and Personality,* 6, 1-13.

Lazarus, R. S., 1993, From psychological stress to the emotions: A history of changing outlooks, *Annual Review of Psychology,* 44, 1-21.

Lazarus, R. S., & Folkman, S., 1984, *Stress, appraisal, and coping*. NewYork: Springer.

Lazarus, R. S., & Folkman, S., 1986b, Stress as a rubic. In A. Eichler, M. M. Silverman, & D. M. Pratt (Eds.), How to define and research stress (pp. 49–53). Washington, DC: American Psychiatric Press, Inc.

Lazarus, R. S., & Folkman, S., 1987, Transactioal theory and research on emotions and coping, *European Journal of Personality,* 1, 141-170.

Lasky, R. G., 1995, Occupational stress: a disability management perspective. In D.E. Shrey & M. Lacerete (Eds.), *Principles and Practices of Disability Management in Industry,* 370-409.

Liu, J., Yang, W., Liu, P., Xu, Z., Cho, S., 2004, Psychometric evaluation of the Chinese (Mainland) version of the Job Content Questionnaire: A study in university hospitals, *Industrial Health*, 42, 260-267.

Lindstrom, K., 1991, Well-Being and Computer-Mediated Work of Various Occupational Groups in Banking and Insurance, *International Journal of Human-Computer Interaction* 3(4), 339-361.

Liu, C., Spector, P. E., & Shi, L., 2007, Cross-national job stress: a quantitative and qualitative study, *Journal of Organizational Behavior,* 28, 209-239.

Lofquist, L.H., & Dawis,R.V., 1969, *Adjustment to Work: A Psychological View of Man's Problems in a Work Oriented Society,* New York, Apperton Century Croft.

Lu, L., Cooper, C. L., Kao, S. F., & Zhou, Y., 2003, Work stress, control, beliefs and well-being in Greater China- An exploration of sub-cultural differences between the PRC and Taiwan, *Journal of Management Psychology*, 18(6), 479-510.

Lu, L., Tsjeng, H., Cooper, C. L., 1999, Managerial stress, job satisfaction and health in Taiwan, *Stress Medicine*, 15, 53-64.

Lundberg, U., 2006, Stress, subjective and objective health, *International Journal of Social*

Welfare, 15, 41-48.

Lwanga, S. K., & Lemeshow, S., 1991, Sample size determination in health studies, Geneva, World Health Organization.

Major, V. S., Klein, K. S., & Ehrhart, M. G., 2002, Work time, work interference with family and psychological distress, *Journal of Applied Psychology,* 87, 427-436.

Marmot, M. G., & Madge, N., 1987, An epidemiological perspective on stress and health. In S. V. Kasl & C. L. Cooper (Eds.), *Stress and health: Issues in research methodology* (pp. 3-26). Chichester: Wiley.

Marmot, M. G., Davey, S. G., Stansfeld, D., Patel, C., North, F., Head, J., White, I., Brunner, E., & Feenet, A., 1991, Health inequalities among British civil servants: The Whitehall 11 study, *Lancet,* 337, 1387-1392.

Marmot, M. G., Siegrist, J., Theorell, T., & Feeney, A., 1999, Health and the psychosocial environment at work. In M. G. Marmot & R.Wilkinson (Eds.), *Social determinants of health.* Oxford: Oxford University Press.

Maslach, C., 1999, Working too hard: A mismatch model of burnout. In Proceedings of *Work, Stress and Health 99: Organization of Work in a Global Economy,*Baltimore: National Institute for Safety and Occupational Health.

Maslow, A., 1968, *Toward a Psychology of Being,* Princeton, N.J: Van Nostrand.

Mason, J. W., 1975a, A historical view of the stress field. Part I. *Journal of Human Stress,* 1, 6-12.

Mason, J.W., 1975b,A historical view of the stress field. Part II, *Journal of Human Stress,* 1, 22-36.

Mathers, C., 1994, Health differentials among adult Australians aged 25-64 Years, *Health Monitoring Series* 1, Canberra: AGPS.

Mauno, S., & Kinnunen, U., 1999, The effects of job stressors on marital satisfaction in Finnish dual-earner couples, *Journal of Organizational Behavior,* 20, 879-895.

McCraty, R., Chaplan, B. B., Creyer, B., 1973, An inner quality approach to reducing stress and improving physical and emotional well being at work, *Stress Medicine,* 13, 193- 201.

Mcdowell, I., & Newell, C., 1996, *A guide to rating scale questionnaires,' Measuring health,* Oxford: University press.

Meichenbaum, D., 1986, Toward a conceptualization of stress. In A. Eichler, M. M. Silverman, & D. M. Pratt (Eds.), How to define and research stress (pp. 55–57). Washington, DC: American Psychiatric Press, Inc.

Melamed, S., Benavi, I., Luz, J., & Green, M. S., 1995, Repetitive work, work under load and coronary heart-disease risk-factors among blue collar workers - the cordis study, *Journal of Psychosomatic Research,*39, 19-29.

Miilunplao, S., Vuori, I., Oja, P., Pasanen, M., & Urponen, H., 1997,Self-rated health as a health measure: The predictive value of self reported health status on the use of physician services and mortality in the working-age population, *Journal of Clinical Epidemiology,* 50,517-528.

Miller, K.I., Zook, E.G., & Ellis, B.H., 1989, Occupational differences on the influence of communication on stress and burnout in the workplace, *Management Communication Quarterly,* 3, 166-190.

Muchinsky, P., 1997, *Psychology applied to work: An introduction to industrial and organisational psychology* (5th Ed.), Pacific Grove, CA: Brookes/Cole Publishers.

Murphy, L. R., 1996, Stress management in work settings: A critical review of the health effects, *American Journal of Health Promotion,* 11, 112-135.

Murphy, L. R., & Hurrell, J. J., 1987, Stress measurement and management in organizations: Development and current status. In A. W. Riley & S. J. Zaccharo (Eds.), *Occupational stress and organizational effectiveness* (pp. 29-51). New York: Praeger.

Murphy, L. R., Hurrell, J. J., Sauter, S. L., & Keita, G. P., 1995, *Job stress interventions.* Washington, DC: American Psychological Association.

Murray, C. J., & Lopez, A. D., 1996, Global burden of disease and injury series, 1 & 2: The global burden of disease. A comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020, Geneva, WHO.

Narayanan, L., Menon, S., & Spector, P. E., 1999, Stress in the workplace: A comparison of gender and occupations, *Journal of Organizational Behavior,* 20, 63-73.

National Institute of Occupational Safety and Health [NIOSH] (1988) Psychosocial Occupational Health. National Institute of Occupational Safety and Health, Washington,

Netterstrom, B., Kristensen, T. S., Damsgaard, M. T., Olsen, O., Sjol, A., 2000, Job strain and cardiovascular risk factors: A cross sectional study of employed Danish men and women, *Brit J Ind Med* 48, 684-89.

Niles, S. G., & Anderson, W. P., 1993, Career development and adjustment: The relation between concerns and stress, *Journal of Employment Counseling*, 30(2), 79-87.

Northwestern National Life Insurance Company (1992), *Employee Stress Levels:Work in America.* USA: NNLIC.

Nunnally, J., & Bernstein, I., 1994, *Psychometric theory.* New York: McGraw-Hill.

O'Driscoll, M. P., 1996, The interface between job and off-job roles: Enhancement and conflict, *International Review of Industrial and Organizational Psychology,* 11, 279-306.

Osipow, S. H., Doty, R. E., & Spokane, A. R., 1985, Occupational stress, strain, and coping across the life span, *Journal of Vocational Behavior*, 27, 98-108.

Pelfrene, E., Vlerick, P., Mak, R., de Smet, P., Kornitzer, M., De Backer, G., 2001, Scale reliability and validity of the Karasek 'Job Demand-Control-Support' model in the Belstress study, *Work Stress,* 15, 297–313.

Peter, R., & Siegrist, J., 1997, Chronic work stress, sickness absence and hypertension in middle managers: General or specific sociological explanations?, *Social Science & Medicine,* 45, 1111-1120.

Peterson, M. F., & Smith, P. B., 1997, Does national culture or ambient temperature explain cross-cultural differences in role stress?, *Academy of Management Journal,* 40, 930-947.

Piko, B., 1999, Work related stress among nurses: A challenge for health care Institutions, *The Journal of the Royal Society for the Promotion of Health,* 119(3), 156- 162.

Pithers, R. T., & Soden, R., 1998, Scottish and Australian teacher stress and strain: A comparative study, *British Journal of Educational Psychology*, 68(2), 269-279.

Probert, B., 1990, *Working Life,* Australia: McPhee Gribble Publishers.

Pocock, S. J., 1983, *Clinical trials: a practical approach,* Chichester Wiley.

Quick, J. C., & Quick, J. D., 1984, *Organizational stress and preventive management.* New York: McGraw-Hill.

Quick, J. C., Quick, J. D., Nelson, D. L., & Hurrell, J. J., 1997, *Preventive stress management in organizations*. Washington, DC: American Psychological Association.

Quine, L., 1998, Effects of stress in an NHS trust: a study, *Nursing Standard* 13(3), 36-41.

Radmacher, S., & Sheridan, C., 1995, An investigation of the demand model of job strain, In S. Sauter & L. Murphy (Eds.), *Organisational Risk Factors and Job Stress,* Washington DC: American Psychological Association.

Reissman, D. B., Hartman, D. E., Lacey, R., 1999, Downsizing, role demands and job stress, *Journal of occupational Medicine and Hygiene*, 41, 289- 293.

Richard, G. V., & Krieshok, T. S., 1989, Occupational stress, strain, and coping in university faculty, *Journal of Vocational Behavior*, 34(1), 117–132.

Richardson, K. M., & Rothsetin, H. R., 2008, Effects of occupational stress management intervention programs: A meta-analysis, *Journal of Occupational Health Psychology,* 13(1), 69-93.

Rick, J., & Guppy, A., 1994, Coping strategies and mental health in white collar public sector employees, *European Work and Organizational Psychologist,* 4, 121-137.

Ryan, R. R., 1996, A survey of occupational stress, psychological strain and coping resources in licensed professional counselors in Virginia. (Doctoral dissertation, Virginia Polytechnic Institute and State University, 1997).

Rydstedt, L. W., Devereux, J., & Sverke, M., 2007, Comparing and combining the demand-control-support model and the effort reward imbalance model to predict long-term mental strain, *European Journal of Work and Organizational Psychology,* 16, 261-278.

Sabir, L. G., Heldge, H., 2003, Violence and stress at work in financial services, Working paper, International Labour Organization.

Sauter, S.L. & Hurrell, J.J.,Jr., 1989, Introduction. In S.L. Sauter, J.J. Hurrell, Jr. & C.L. Cooper (Eds.), Job Control and Worker Health, Chichester, England: Wiley

Schnall, P., Belkicc, K., Landsbergis, P., Baker, D., 2000, Why the workplace and cardiovascular disease? In: The Workplace and cardiovascular disease. *Occupational Medicine: State of the Art Reviews,* 15(1), 1-6.

Schnall, P. L., Landisbergis, P. A., & Schwartz, J., 1998a, A longitudinal study of job strain and ambulatory blood pressure: Results from a 3 year follow up, *Psychosocial Medicine*, 60, 697-706.

Schnall, P. L., Landisbergis, P. A., & Baker, D., 1994, Job strain and cardiovascular disease, *Annual Review of Public Health,* 15, 381-411.

Schuler, R. S., 1980, Definition and conceptualization of stress in organizations, *Organizational Behavior and Human Performance,* 25,184-215.

Scott, D. B., 2001, The costs and benefits of women's family ties in occupational context: Women in corporate-government affairs management, *Community, Work and Family,* 4, 5-27.

Selye, H., 1936, A syndrome produced by diverse noxious agents, *Nature,* 138, 32.

Selye, H., 1946, The general adaptation syndrome and diseases of adaptation, *Journal of Clinical Endocrinology,* 6, 217-230.

Selye, H., 1967, *In vivo. The case for supra molecular biology.* New York: Liveright.

Selye, H., 1974, *Stress without distress.* Philadelphia: J.B Lippincott Co.

Selye, H., 1983, The stress concept: Past, present and future. In C. L. Cooper (Ed.), *Stress research: Issues for the eighties* (pp. 1-20). Chichester: John Wiley and Sons.

Seyle, H., 1975, Confusion and controversy in the stress field, *Journal of Human stress*, 1, 37-44.

Seyle, H., 1976, *The stress of life.* New York: McGraw-Hill.

Sharit, J., & Salvendy, G., 1982, Occupational stress: Review and reappraisal, *Human Factors,* 24, 129-162.

Shergold, P., 1995, *Managing Workplace Health, In* Proceedings of *the Workplace Health Conference,* Sydney.

Shirom, A., 1982, What is organisational stress?, A facet analytic conceptualization, *Journal of Occupational Behaviour,* 3, 21-37.

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

Siegrist, J., 1998, Adverse health effects of effort-reward imbalance at work: Theory, empirical support, and implications for prevention. In C. L. Cooper (Ed.), T*heories of organizational stress* (pp. 190-204). Oxford: Oxford University Press

Siegrist, J., & Marmot, M. G., 2004, Health inequalities and the psychosocial environment - two scientific challenges, *Social Science & Medicine,* 58, 1463-1499.

Sims, J., 1997, The evaluation of stress management strategies in general practice: an evidence lead approach, *British Journal of General Practitioners*, 1997, 47, 577-582.

Sisson, K. and Marginson, P., 2006, The Impact of Economic and Monetary Union on Industrial Relations: A Sectoral and Company View, European Foundation for the Improvement of Living and Working Conditions, Dublin.

Sutherland, V. J., Cooper, C. L., 1988, Job stress, satisfaction and mental health among general practitioners before and after the introduction of the new contract. *Br Med,* 304, 1545-48

Smet, P., Sans, S., Dramaix, D., Boulenguez, D., Backe, G.,et al 2005, Gender and regional differences in perceived job stress across Europe, *The European Journal of Public Health,*

15(5), 536-545.

Smith, M. J., Conway, F. T., and Karsh, B., 1999, Occupational Stress in Human Computer Interaction, *Industrial Health,* 37, 157-173.

Sparks, K., Cooper, C. L., Fried, Y., & Shirom, A., 1997, The effects of work hours on health: A meta-analytic review, *Journal of Occupational and Organizational Psychology,* 70, 389-400.

Sumathipala, A., & Murray, J., 2000, New approach to translating instruments for cross-cultural research: a combined qualitative and quantitative approach for translation and consensus generation, *International Journal of Methods in Psychiatric Research*, 9(2), 87- 95.

Szymanski, E.M., 1999, Disability, job stress, the changing nature of careers, and the career resilience portfolio, *Rehabilitation Counselling Bulletin*, 42, 279-284.

Tabachnik, M. T., & Fidell, L. S., 1993, Uing multivariate statistics, London:Harper & Row.

Terry, D., 1991, Coping resources and situational appraisals as predictors of coping behaviour, *Personality and Individual Differences,* 12, 1031-1047.

The Encyclopedia of Management, 1973, Van Nostrand Reinhold Co.

Theorell, T., & Karasek, R. A., 1996, Current issues relating to psychosocial job strain and cardiovascular disease research , *Journal of Occupational Health Psychology,*1, 9-26.

Toivanen, H., Lansimies, E., Jokela, V. and Hanninen, O., 1993, Impact of Regular Relaxation Training on the Cardiac Autonomic Nervous System of Hospital Cleaners and Bank Employees, *Scandinavian Journal of Work and Environmental Health,* 19(5), 319-325.

Toohey, J., 1993, Quality of working life project: Report on the study of occupational stress in Commonwealth Government employment. In Proceedings of *The Second National Rehabilitation Conference,* 312-325, Sydney: CRS.

Toohey, J., 1994, Quality *of Working Life Project: Report on a Study of Occupational Stress in Commonwealth Government Employment,* Canberra: AGPS.

Toohey, J., 1995, Managing the stress phenomenon at work, In P. Cotton (Ed.), *Psychological Health in the Workplace: Understanding and Managing Occupational Stress,* 51-72, Brisbane: The Australian Psychological Society.

Townley, G., 2000, Long hours culture causing economy to suffer, *Management Accounting*, 78 (6), 3-5.

Trivette, P. S., 1993, A national survey of occupational stress, psychological strain and coping resources in elementary school counselors. (Doctoral dissertation, Virginia Polytechnic Institute and State University, 1992).

Tsutsumi, A., & Kawakami, N., 2004, A review of empirical studies on the model of effort-reward imbalance at work: Reducing occupational stress by implementing a new theory, *Social Science & Medicine,* 59, 2335-2359.

Turnage, J. J., & Spielberger, C. D., 1991, Job stress in managers, professionals, and clerical workers, *Work and Stress,* 5, 165-176.

U.S Department of Labour, Bureau of Labour Statistics, 1999, Issues in labour statistics.

Vagg, P. R., & Spielberger, C. D., 1998, Occupational stress: Measuring job pressure and

organizational support in the workplace, *Journal of Occupational Health Psychology,* 3, 294-305.

Ursprung, A.W., 1986, Incidence and correlates of burnout in residential service Settings, *Rehabilitation Counselling Bulletin*, 29, 225-239.

Vander Hek, H., & Plomp, H. N., 1997, Occupational stress management programmes: a practical overview of published effect studies, *Occupational Medicine,* 47, 133-141.
Vander Klink, J.,Blonk, R., Schene, A., & Dijk, F., 2001, *American Journal of Public Health,* 91(2), 270-276.

van Kempen, E. E. M. M., Kruize, H., Boshuizen, H. C., Ameling, C. B., Staatsen, B. A. M., & de Hollander, A. E. M., 2002, The association between noise exposure and blood pressure and ischemic heart disease: A meta-analysis, *Environmental Health Perspectives,*110, 307-317.

Van Vegchel, N., de Jonge, J., Bosma, H., & Schaufeli, W., 2005, Reviewing the effort-reward imbalance model: Drawing up the balance of 45 empirical studies, *Social Science & Medicine,* 60, 1117-1131.

Verhoeven, C., Maes, S., Kraaij, V., & Joekes, K., 2003, The job demand-control-social support model and wellness/health outcomes: A european study, *Psychology and Health,* 18, 421-440.

Wadsworth, E., Dhillon, K., Shaw, K., Bhui, K., Stansfeld, S., Smith, A., 2007, Racial discrimination, ethnicity and work stress, *Occupational Medicine,* 57(1), 18-24.

Warr, P., 1994, A conceptual framework for the study of work and mental health, *Work & Stress,* 8, 84-97.

Watson, D., & Pennebaker, J., 1989, Health complaints, stress and disease: Exploring the central role of negative affectivity, *Psychological Review*, 96, 234-254.

Westman, M., & Eden, D., 1992, Excessive role demand and subsequent performance, *Journal of Organizational Behavior,* 13, 519-529.

Wharton, A., & Erickson, R. J., 1993, Managing emotions on the job and at home: Understanding the consequences of multiple emotional roles, *Academy of Management Journal,* 36, 273-296.

World Health Organization, 2003, Authored by: Cassitto, M.G., Fattorini, E., Gilioni, R., Rengo, C. & Gonik, V. 'Raising Awareness of Psychological Harassment at Work'. Geneva: WHO, (Protecting Workers' Health series No. 4). Geneva: WHO.

Williamson, A., 1994, Stress in the workplace: National problem, national Approaches, In Proceedings of the *National Occupational Stress Conference: Stress and Well-being at Work,* Gold Coast: Australian Psychological Society.

Wong, P. T. P., 1993, Effective management of life stress: The resource congruence model, *Stress Medicine,* 9, 51-60.

Woods, V., 2005, Work-related musculoskeletal health and social support, *Occupational Medicine, 55*, 17-189.

Zautra, A. J., 2003, *Emotions, stress, and health*. New York: Oxford University Press.

Section 4

Impact of research results:

1. Relevance of results achieved to scientific advancement

It can be seen that occupational stress has not been studied methodically in the banking sector in Sri Lanka while the same sector has been drastically influenced by the new policies. Standardized, validated instruments which can be administered easily to measure occupational stress are scarce in Sri Lanka. The Sinhalese version of the three selected scales of the JCQ used in the present study to assess occupational stress has been proven to be a valid and reliable instrument and therefore it could be recommended for use for surveys to study about occupational stress in other parts of the country in the banking sector. Furthermore, comparison of Sri Lankan evidence with other countries using a standardized instrument on occupational stress can be achieved. This study has paved the way for further research to find out risk factors of occupational stress in depth and to find out effective stress management interventions as well as mode of delivery of the interventions and assessment of associations of occupational stress and the non- communicable diseases.

2. Relevance of results achieved to national/socio-economic development

Occupational stress has strong associations with non-communicable diseases such as cardiovascular diseases, diabetes, mental illnesses etc. Occupational stress is also associated with unhealthy behaviours such as smoking, physical inactivity and unhealthy eating habits and these in turn are risk factors for cardiovascular diseases and diabetes. Non-communicable diseases are increasing in Sri-Lanka not only as a proportion of the burden of disease, but also in incidence and prevalence. Among the more important of these are accidents, heart disease, mental illness, diabetes and cancers (Ministry of Health 2009).

In the promotion of cardiovascular health, the traditional advice for people to stop smoking, cut down drinking, eat less fat, and engage in physical activity has been shifted towards a more holistic view. Structural and psychosocial factors, in addition to behavioural ones, are increasingly seen as important determinants of public health. The findings of the present study indicate that work related stress is an occupational health problem among middle level managers and operational staff members in domestic commercial banks in the Colombo district. Therefore, it could be made use of to plan interventions to address the issue of occupational stress by the relevant stakeholders.

3. Dissemination/ application of research output

The findings of the present study have been made available to relevant authorities in all domestic commercial banks in Sri- Lanka. A brief report was compiled and sent to the head of the human resource and training centers of all domestic commercial banks. Furthermore, a report of the study was made available to the relevant authorities at the occupational health unit of the Ministry of Health in order to addresses this problem urgently. Papers were presented at local as well as international conferences to disseminate the study findings.

National Digitization Project

National Science Foundation

Institute : National Science Foundation

1. Place of Scanning : Sanje (Private) Ltd, Hokandara
2. Date Scanned : 2017/04/18
3. Name of Digitizing Company : Sanje (Private) Ltd, No 435/16, Kottawa Rd, Hokandara North, Arangala, Hokandara
4. Scanning Officer

Name : H.P.A.V. Caldera

Signature : .....

Certification of Scanning

I hereby certify that the scanning of this document was carried out under my supervision, according to the norms and standards of digital scanning accurately, also keeping with the originality of the original document to be accepted in a court of law.

Certifying Officer

Designation : Information Officer

Name : Renuka Sugathadasa

Signature : .....

Date : .....

"This document/publication was digitized under National Digitization Project of the National Science Foundation, Sri Lanka"