Chapter 1

INTRODUCTION

1.1 Work related stress – An overview

Occupational stress is gaining significance in both corporate and social agenda. The business environment has become grown more complex today. The organizations are now experiencing a new culture of increasing speed, efficiency and competition. In industrialized countries, considerable changes in the conditions of work and changing complexions of the work place, is found during the last decade, due to the social and technical development (NIOSH, 2002). Today as a consequence, people at work are
exposed to high quantitative and qualitative demands at workplace. In multinational companies, lean production and downsizing resulted in fewer employees to produce more and which in turn raised the level of work stress due to over stimulation (Conti et al., 2006; Roed and Feveng, 2007; Vahtera et al., 2004).

Over a last decade, the escalating costs associated with workplace stress indicate an international trend among industrialized countries. A study of mental health policies and programs for workers in Finland, Germany, Poland, United Kingdom and United States (ILO, 2000) shows an increasing incidence of mental health problems, with almost one in ten workers subjected to stress, depression, anxiety or burnout, leading to consequences of unemployment and hospitalization. The study of work stress in member states of European Union (EU), points out that on an average 22% of the working Europeans experience work stress. In 2002, the annual economic cost of work related stress in the EU-15 was estimated at € 20,000 million. (EASHAW, 2005). The stress related absenteeism in the United states is four times higher than that resulting from workplace accidents and occupational diseases. Study in Canada shows that 38.8% of Canadians between the age group of 15 and 75 are stressed (Brun and Lamarche, 2006). In Japan, the sheer magnitude of working hours has been one of the suggested causes for death due to over work or ‘Karoshi’ (Shimizu et al., 1997). A survey conducted by the industry body Assocham has revealed that stress levels among the Indian employees are raising (The Economic times, 2009) and is likely to cost India’s exchequer around ₹72000 crores during 2009-15.
1.2 Definition of Stress

The Health and Safety Executive (HSE-UK) (Palmer et al., 2004) defines stress as “the adverse reaction people have to excessive pressure or other types of demand placed upon them”.

The definition clearly states that stress is the result of excessive demands or pressures. A certain amount of pressure is inevitable in any job. Dealing successfully with pressure can give people a sense of achievement and can motivate people.

Work related stress is a negative and unpleasant condition which may be experienced when a person perceives that they are unable to meet the demands and pressures that are placed upon them and which may be associated with a range of ill health effects, both physiological and psychological (Cox, 1993).

The National Institute of Occupational Safety and Health (NIOSH - USA) (NIOSH , 1999) defines stress as “the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, and needs of the worker.”

According to NIOSH, working conditions play a primary role in causing work stress. However role of individual factors is not ignored. NIOSH is of the view that exposure to stressful working conditions (called job stressors) can have direct influence on worker safety and heath and says that individual and organizational factors may intensity the effects of stressful working conditions (NIOSH , 2002).
1.3 Types of stressors

The common type of stressors found at the work place are environmental stressors and occupational stressors (Vischer, 2007; McCoy and Evans, 2005). Environmental stressors are those which arise from extremes of temperatures and humidity, inadequate ventilation, excessive noise and vibration and presence of airborne contaminants such as dusts, fumes and gases. Occupational stressors are associated with too much or too little work, work relationships, decision latitude, role, support and changes at the work (HSE, 2006). It is observed that the presence of any one of the above or both can induce work stress.

1.4 The effect of stressors

Work stress results in loss of control at work due to the imbalance between the pressures being exerted and the resources of the individual. When the pressure/demand becomes too high, individual thinking, feeling and behavior get altered. As a result, changes in psychological functions occur which, if unresolved can lead to health problems. However, people tend to perform better when under a moderate amount of pressure.

In Fig. 1.1 both A&B represent high performing individuals. However A is working comfortably within the optimum zone, while B is working in high risk zone, which leads to the development of adverse reactions. Working at peak performance (highest point on the graph) is acceptable for short periods, but the risk of remaining at the peak for long period is likelihood of additional events adding to the pressure and pushing the individual into over load zone. Once an individual have moved
past in to the over load zone, the performance of the individual drastically decreases (IPIECA, 2006). Without intervention this can result in illness.

![Performance Curve](image)

**Figure 1.1: Performance curve**

### 1.5 Common causes of Stress in industry

It is accepted that any job can cause stress and also that it is not just about over work. Boredom and monotony can also be stressful. Some of the activities which can lead to occupational stress (NIOSH, 2002; Levi, 2000) at the work place are

- dealing with clients or the public
- cuts, reorganizations and lack of job security
- poor working conditions
- threats of violence, harassment and bullying
- lack of flexibility
- lack of control over work
- too demanding a job or too high a work load
- monotonous or boring work
- lack of training
• excessive hours and shift work
• working in isolation
• working relationship

1.6 Impacts of Work Stress

Stress affects the physical and mental health of the workers who are exposed to it. The research conducted in Europe highlights that work related stress is the second most common cause of illness after musculoskeletal disorders (Teasdale, 2006). The commonly found short and long term symptoms of work stress are listed below.

1.6.1 Short Term effects

The short term symptoms which arise from the hormonal changes include (EASHAW, 2009; Jex and Crossley, 2005; NIOSH, 2002)

• Headaches
• Indigestion
• Raised blood pressure
• Disturbed sleep
• Skin rashes
• Muscle fatigue
• Anxiety
• Irritability
• Forgetfulness
• Drop in performance
• Increased accidents
• Increased use of alcohols, tobacco, drugs
1.6.2 Long term effects

In the long term the range of symptoms can be linked to a variety of illness. (Jex and Crossley, 2005; NIOSH, 2002).

- Heart and circulatory system
  - Hypertension
  - Heart diseases
  - Strokes
  - Heart attacks

- Digestive system disorders
  - Chronic inflammation
  - Peptic ulcers
  - Diarrhea

- Immune system
  - Reduced resistance to infection
  - Chronic asthma
  - Possible increased cancer risk

- Reproductive system disorders
  - Infertility
  - Increased risk of miscarriage
  - Increase risk of low birth weight babies
• Mental health

Chronic anxiety

Depression

Mental breakdown

Suicide

Alcohol/substance abuse

Social isolation

The effect of the above is well documented in literature

1.7 Recognizing and understanding the symptoms of work stress

Recognizing and understanding the common symptoms of work stress can help management to take corrective actions before serious problems emerge. The following list identifies some of the common observable symptoms of stress. Since no two people are alike, not everyone will have all symptoms or particular type of symptom. Some people are more prone to angry outbursts, aggressive behaviors, and even violence when stressed out, others tend to withdraw and become depressed. (Leka et al., 2003; NIOSH, 2002).
• **Emotional symptoms are**
  
  Chronic anxiety, nervousness and worrying
  Reduced frustration tolerance
  Emotional outbursts
  Depression
  Physical symptoms
  Decreased energy level
  Uncharacteristic clumsiness

• **Mental symptoms are:**
  
  Difficulty in concentrating
  Forgetfulness
  Difficulty in thinking clearly
  Paranoia, defensiveness and irrational fears
1.8 Work stress and safety

According to safety experts, unsafe behaviour are the leading contributor to accidents and injuries in the workplace. Research shows that unsafe behaviour have significant role in workplace accidents and injuries than do unsafe environmental factors such as wet floors, unsafe equipments etc. Experts estimate that unsafe behaviour amount for 80% of the workplace accidents and injuries (Caruso et al., 2004; Kathryn and Harie, 1998). Therefore focusing solely on physical environment will solve only 20% of the problem. One of the leading causes of unsafe behaviour is stress. Since stress negatively affects how people think, act and react, it makes employees more vulnerable to accidents and injuries.

By reducing employee stress, companies can significantly reduce the behavioral problems that lead to safety issues (HSE, 2006). By reducing stress, they can also reduce other stress related costs such as absenteeism, turnover, reduced productivity grievances, and litigation.

1.9 The Legal Frame Work

Under the health and safety at work Act 1974, the employers in UK have the duty under the law to ensure the health and safety of the employees at work (HSE, 2009; Cousins et al., 2004). There is also legal frame work through the manner in which the courts and employment tribunals have adjudicated in stress cases. In addition to this The management of health and safety at work Regulations, 1999 require employers to assess health and safety risk, and to introduce prevention and control measures based on the risk assessment.
Introduction

The occupational safety and health Act 1970 was created by both National Institute of Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA). OSHA is part of the US Department of Labor and is responsible for developing and enforcing workplace safety and health regulations. NIOSH is an agency established to help assure safe and healthful working conditions for working men and women by providing research, information, education and training in the occupational safety and health.

In India the Factories act, 1948 is enacted for occupational safety and health and welfare of the workers at the workplaces. The provisions of the act relate to i) Health ii) Safety iii) Welfare facilities iv) Working hours.

On 5th Feb 2009, the Union cabinet of India has approved the national policy on Safety, Health and Environment at work place to address the issues of securing health and safety of workers in the country.

The Department of Factories and Boilers, Government of Kerala has formed various rules, known as Kerala Factory rules 1951, Under Factories act 1948 for ensuring safety, health and welfare of the workers.

National Safety Council (NSC) was set up by Ministry of Labour, Government of India (GOI) on 4th March 1966 to generate, develop and sustain voluntary movement on safety, health and environment at the national level. The various activities of NSC include organizing and conducting specialized training courses, conferences, seminars and workshops, conducting consultancy studies such as safety audits, hazard evaluation, risk assessment, designing and developing HSE promotional materials etc.
1.10 Measurement of work stress in Industries

The most common method of evaluation of work stress in industries is in terms of periodic stress surveys and assessment and such a process is called psychological risk assessment (Hicks and Caroline, 2006; Stranks, 2005). Such surveys and audits are tailored to specific individuals and organizations in which they work. This can provide a baseline measure from which subsequent intervention can be evaluated. Normally line managers play the lead role for the survey or audit and provides feedback between employer and employee. Such surveys or audits are normally carried out internally by the human resource department.

Qualitative data from the individual employees who expresses work stress are collected through interviews (Hicks and Caroline, 2006). The employees keep a stress diary prior to the interview. Such type of data can be collected from the focus groups or work groups.

Quantitative data collection is a very popular method of data collection nowadays (Murphy and Schoenborn, 2008; Stranks, 2005). This can be done by means of self-completed questionnaires. The validity and reliability of such questionnaires has to be ascertained before the administration.

1.11 The need for the present work

Most of the studies on work related stress have been done in developed countries. India being a large country with high population and quite a large number of people employed in the industrial sector, only little efforts have been found in assessing the work stress. Therefore it is worth while to investigate and analyze the factors responsible for work stress.
A recent survey conducted in India among employees found 57% rise in work related stress in India, due to global recession compared to last two years, which in turn affected their performance (The Economic times, 2009). It is also reported that the intensity of work stress varies with type of industry and occupation (Shimizu et al., 1997). Investigations carried out in developed countries reveal that work stress varies with age, designation, educational qualification, gender difference, language etc. (Shields, 2006). Therefore there is a wide scope for analyzing the factors responsible for work stress among the employees in the Indian industries by using reliable and valid instruments.

Many earlier research findings projected the influence of work environment on work stress (Thayer et al., 2009; Jennings, 2008). It is worthwhile in analyzing the factors responsible for work stress in different type of industries in India.

The modelling of work stress by factor analysis leaves enough scope for analyzing the work stress under the influence of different factors. The structural equation modelling of work stress where the complex relationship of work stress with different factors responsible for it can be modelled and tested, which is not possible by other multi variable techniques (Kaiser and Coffery, 1965).

The multinomial logistic regression modelling (Mala et al., 2010; DeMaris et al., 2003) is another potential area of research, where the odds of improvement in work stress for unit increase in the factors responsible for it can be evaluated. Little research is done so far in the modelling of work stress by this method.
1.12 Research objectives

The major objectives of the study are

- To identify the factors responsible for work stress
- To develop a valid and reliable instrument for the evaluation of work stress by using the factors identified
- To analyze the influence of these factors among the employees of different age groups, designation levels and experience levels in manufacturing industries
- To develop models for the prediction of work stress by using the above factors

1.13 Research methodology

In the absence of well defined standards to assess the work stress in India, an attempt is made in this direction to identify and develop the factors responsible for it. Accordingly with the help of existing literature, and in consultation with the safety experts, seven factors were developed for the evaluation of work stress. Initially draft questionnaire containing fifty two items, covering the above factors were prepared. This was subsequently fine tuned to 35 item questionnaire after conducting preliminary survey and discussion with the safety professionals and management experts. Five large scale profit making manufacturing industries were selected for the study by random sampling. All the industries were profit making out of which three are chemical industries and two are heavy engineering industries. The participants for the study
consists of engineers, supervisors and workers. Responses to items were solicited in five point Likert scale from Always to Never. Ten demographic questions were also included in the questionnaire for various analyses. The response rate was 81.3%.

1.14 Organization of the thesis

The thesis is presented in six chapters, Chapter-1, gives an introduction about the work. In chapter-2, a review of literature in which different approaches for the study of work stress is presented. This is followed by a review of factors influencing the stress with respect to the context and content of work is made. A review of modelling of work stress by using different factors in developed countries is discussed. Observation from the literature review and motivation for the present study are also discussed there.

The factors developed for the evaluation of work stress are identified and discussed in chapter-3. This is followed by a discussion on the development of an instrument for measuring work related stress. Validation and reliability of data collected through a questionnaire based survey in five manufacturing industries in Kerala is presented. The relationship between the different factors is also analyzed in this chapter.

The influence of various factors responsible for work stress in the selected five industries is analyzed in chapter-4. The analysis was done for different age groups, designation levels and employees having different experience in these industries. This was done by means of one-way ANOVA. A cross comparative study of each factor is made at the end of each analysis. The analysis was further extended to chemical and heavy engineering industries.
In chapter-5, modelling of work stress is discussed. The development of different type of models, namely factor models and structural equation models and multinomial logistic regression model is presented.

In chapter-6, summary and conclusions of the research, and scope for further research are presented.