

**PERCEIVED STRESS AND ITS ASSOCIATION WITH
PSYCHOSOCIAL WORKING CONDITIONS**

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Stress at work is a serious problem to an individual and for a society as a whole. Work stress is a risk for different kinds of psychological and physical health problems. Psychosocial work environment imply several risk factors involved with psychological processes associated with the social environment of work that may lead to adverse health effects including stress.

Secondary data of a cross-sectional study conducted by the Finnish Institute of Occupational Health (FIOH) was used find associations between psychosocial work stressors and stress. Total of 2118 Finnish working population were randomly selected from the Finnish population register for telephone interview. Chi-square test was used to find association between stress and its possible consequences.

Altogether 67.3% of the workers were involved in permanent work. In total 8.9% workers had experienced quite a lot of stress, majority of them were female. Work schedules like long working hours, overtime work and flexible work requested by supervisors were significantly associated with workers' perceived stress. Stress at workplace was found to have associated with interpersonal relation and support from colleagues and supervisors. However, stress among workers was not associated in favor of night and weekend work schedules and smoking and alcohol drinking behaviors.

The findings suggest that females perceived quite a lot of stress more often than male due to stress related factors. The most important identified work stressors were working hours, lack of support from colleague and supervisors, rush at work, strenuous type of work and workers' inability to influence workload.

ABBREVIATIONS

CSDH	-	Commission on Social Determinants of Health
CVD	-	Cardiovascular Diseases
FIOH	-	Finnish Institute of Occupational Health
GNP	-	Gross National Product
HSE	-	Health and Safety Executive
ILO	-	International Labour Organization
MSD	-	Musculoskeletal Disorder/s
SPSS	-	Statistical Package for Social Sciences
WHO	-	World Health Organization

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1 INTRODUCTION

Stress is regarded as a common aspect of modern life. It is complex to define stress in terms of its causes, symptoms and effects. In general, it is used to describe the physiological and/or psychological body response to the conditions that necessitate behavioral adjustment. Stress exerts psychological effects on health and multiple mechanisms are involved during the process (Jarczok et al. 2013).

It is now widely known that stress at work is a common problem and it has been defined in many contexts. In psychological perspective, stress at work is due to an imbalance between environmental supply and individual needs and also an imbalance between environmental demands and individual motives and abilities (Cox et al. 2000). World Health Organization (WHO) has defined workplace stress as a pattern of physiological, cognitive and behavioral reactions to some extremely taxing aspects of work content, work organization and work environment (Houtman et al. 2007). International Labour Organization (ILO) defined psychosocial hazards regarding the interactions among job content, work organization and management, environmental and organizational conditions, employees' competencies and needs. Those interactions can cause hazardous effect on employees' health through their perceptions and experience. Psychosocial stress is obvious at workplace and its cost in terms of workers' health, absenteeism and performance is immense (Imtiaz and Ahmad 2009).

Work related stress has been explained in various frameworks and theories, yet it can be explained as a psychological status that reflects the relationship between individuals and their work environment (NIOSH 1998). Work related stress is one of the most frequent stressors, accompanied by health-related and then financial problems (Nakao 2010). When there is inconsistency between work demands and pressures to the workers' knowledge and abilities that can challenge their ability to cope the stress (NIOSH 1998, ILO 2009). According to the Health and Safety Executive (HSE), stress is an adverse reaction to excessive or extreme pressures or demands that may be placed upon individuals. Work-related stress can be presented in the context of workers response to work demands and pressures. Stress at work is associated with lower levels of employees health and productivity, consequently increases absenteeism due to sickness (HSE 2001).

Stress can impair an employees' health and the work performance. Regardless of well-established findings that the association between workers' health and reduced on-the-job productivity, ever growing absenteeism and higher health care expenditure, there are barriers that remain largely unresponsive to address these issues (Putnam and McKibbin 2004).

This thesis focuses on less addressed issues of psychosocial factors associated with workers and working conditions that could directly or indirectly influence the workers' health in Finland. The main aim of this study is to clarify the associations between psychosocial stressors and stress due to work and working conditions in Finland. Further, the research explores the associations of stress to its possible consequences among Finnish working population.

2 THEORETICAL BACKGROUND

2.1 Magnitude of work-stress

Work-related stress has become a major occupational risk factor. According to WHO Global Burden of Disease Survey estimates, depression and anxiety disorders, together with stress-related mental health conditions, will be highly predominant and will be second to ischemic heart disease in terms of disabilities by the year 2020 (Murray and Lopez 1996, CSDH 2008). The cost incurred due to high burden of work related stress is ever increasing and creating a higher risk to the workers and society as a whole. The HSE predicted the cost of £530 million occurred due to the sickness absence as a consequences of stress, depression and anxiety perceived by the workers in the year 2006 (Labour Force Survey, HSE 2007). In France, work-related stress was estimated to cost 14% to 24% of the total spending of social security on occupational illnesses and work injuries (Bejean and Sultan-Taieb 2005). According to the United Kingdom Department of Health and the Confederation of British Industry, 15 to 30 percent of workers experienced some form of mental health problem during their working lives (WHO 2000).

WHO predicted that spending on psychological health is less than two US dollars per person, per year which is less than 25 percent in low income countries (WHO 2011). Unlike many least developed and developing countries, conscious of work-related stress in the industrialized countries had started since several decades and people are being more aware with work-related stress and its consequences (Rantanen 1999, Houtman et al. 2007). However, there has been increasing administrative and insurance costs of mental disorders in workplace in many developed countries. The situation have provoked intense concern in the interrelations between work and mental health and how best to deal this issue to minimize the effect on the individual and the employer (Goetzel et al. 2002).

2.2 Stress theories

Psychosocial factors at work are described on the basis of stress theories and model of occupational health. The two significant stress models that closely deal with the impact of psychosocial stressors at work are the demand-control model, and the level of control that the worker is able to exert (Netterstrom et al. 2008). Karasek also described two key dimensions of the psychosocial factors; psychological job demands and decision latitude.

Latter supplemented with decision authority (control over work) and skill discretion (variety of work and opportunity for use of skills) (Karasek 1979).

Job demand theory explains how job demands and resources have unique and multiple effects on job stress and motivation (Bakker et al. 2003) while job control (or decision latitude) model deals with both socially predetermined control over comprehensive features of work performance (e.g. quantity of work, pace, scheduled hours, time of breaks, policies and procedures) and skill preferences (i.e. control over the use of skills by the worker). Moreover, the revised job strain model embraces social support to the model as a third component (Johnson and Hall 1988). Hemingway and Marmot defined psychosocial factors as "a measurement that potentially relates psychological phenomena to the social environment and to pathophysiological changes" (Hemingway and Marmot 1999).

Psychosocial work characteristics include various potential risk factors involved with psychological procedures interrelated to the social aspects at work that could be impose risk in the causation of sickness. After rigorous comparative overview of the most important work stress models in relation to work features, Kompier found some frequently used work-related features. These comprise job demands, autonomy, skill variety and social support. Factors less frequently included were feedback, task identity, job future ambiguity and pay (Kompier 2005).

Job strain which is described as the combination of high demands and low control is associated with the highest risk for developing common mental disorders (Netterstrom et al. 2008). Psychosocial work environment imply risk factors associated with the social environment of work that may lead to adverse health effects. Adverse health outcomes associated with job-strain includes heart disease and musculoskeletal problems, which in turn enhance additional impact of psychological stress (Bambra et al. 2007). Due to unevenly distribution of job-strain, workers at lower skill level jobs are most likely to be affected with depression (LaMontagne et al. 2008). A relation has been established with mental health and psychological processes like behaviors, thoughts and emotions that determine the causal impact of biological, social and circumstantial risk factors on mental health (Kinderman et al. 2013). In general, work stress models are aimed at finding the work life characteristics that possibly cause frequent and long lasting stress and hence be predictive of disease endpoints (McEwen 1998).

2.3 Work stress and health risks

Occupational stress is a risk for different psychological and physical health problems such as high blood pressure, work-related musculoskeletal disorders (MSD), loss of work performance, or social interaction and support, or recognition, and others (Belkic et al. 2004, Adler et al. 2006, Siegrist and Dragano 2008, Juster et al. 2013, Pereira and Elfering 2013). A study conducted in France in 2005 evaluated the costs of work-related stress identified three major illnesses; cardiovascular diseases (CVD), depression, MSD and back pain due to the exposure to stress at work (Bejean and Sultan-Taieb 2005).

Adverse working conditions like effect of physical workload, noise, long working hours, shift work and social job characteristics are reported to be some of the important risk factors for CVD. People with a very high workload and continuous work over 11 hours a day, may be at increased risk of CVD (Sokejima and Kagamimori 1998). Psychosocial stress is associated with increased risk of acute myocardial infarction and with three or more psychosocial work stressors, triggering an increased risk of cardiovascular death (Rosengren et al. 2004).

Demographic, behavioral and biological factors have been associated with cardiovascular mortality among the workers in Finland. Factors like higher age, male sex, low work status, smoking, sedentary lifestyle, high blood pressure, high cholesterol concentration and high body mass index were identified factors that increased the risk of death (Kivimaki et al. 2002). In general, psychological stress has been associated with the development of CVD and the pathogenesis of essential hypertension (Kivimaki et al. 2002, Backe et al. 2012).

According to Eurostat figures on recognized occupational diseases, MSD are among the most common occupational disease. Psychological and MSD are major problems that lead to absenteeism and disability costing 3% of total GNP (Koukoulaki 2004). In France, MSD have caused to seven million workdays lost, about 710 million EUR of enterprises' contributions in 2006 (Schneider and Irastorza 2010). Both physical and psychosocial workplace stressors increase the risk of MSD. Factors like intensive load, monotonous work and low job control are associated between psychosocial stressors and MSD (MacDonald et al. 2001).

Besides environmental factors, psychosocial factors also plausibly have a role in the development of cancer (Antonova et al. 2011). Stressed people are more likely to smoke

tobacco, consume excessive alcohol and obese as compared to stress free individuals which are the important risk factors for the development of cancer (Heikkila et al. 2012a, Heikkila et al. 2012b). However, a meta-analyses findings suggested that the work related psychosocial stress is improbable to be one of the important risk factor for cancers. The study provided no evidence of association between job strain and overall cancer risk (Heikkila et al. 2013).

High levels of psychological demands comprising fast work pace and high conflicting demands are predictive of common mental disorders. Typically, mild-to-moderate depressive and anxiety disorders are frequent in general population and identified by screening questionnaires and standardized psychiatric interviews (Leka and Jain 2010). Mental health disorders may arise due to a number of sources, comprising work and non-work-related factors (Chen et al. 2009). Out of nine identified sources of occupational stress, poor mental health was found to have significant association. The others sources include: conflict between job and family/social life, poor development of career and achievement at work, safety problems at work, management problems and poor relationship with others at work, poor physical environment of the work place, uncomfortable ergonomic factors at work, and poor organizational structure at work (Chen et al. 2009).

Work-related adjustment disorder and depression are frequent work-related mental problems and cause for sick leave, with consequences such as great distress and adverse economic effects for the affected person and substantial costs for society (Eklund and Erlandsson 2011). Depression is one of the most prevalent and costly health issues affecting workforce. Ranking at the fifth place in the list of disorders with the highest disability-adjusted life-years score, WHO reported that depression is one of the most disabling disorders (Murray and Lopez 1997).

In the working population, depression and simple phobia were found to be the most prevalent disorders. Strong association was noticed between aspects of low job quality and incident of depression and anxiety. Although the findings for fixed-term work were not consistent and there were also evidences that uncommon works were associated with poorer mental health (Sanderson and Andrews 2006). The indirect costs associated with depressive illness can be traced to loss of productivity and huge economic encumbrance. Depressed individuals exert a significant cost burden for employers. Mental health have significant impact on productivity losses, along with increased absenteeism and short-term disability, higher

turnover and sub-optimal performance at work (Sullivan 2005). Low level of decision latitude and social support at work and high levels of psychological demands are found to be significant predictors of subsequent depressive symptoms among both genders (Niedhammer et al. 1998).

Along with psychological or physical health effects, there have been increasing evidence of psychosomatic disorders due to occupational stress. Stress as related by working environment is an important determinant for the development of psychosomatic complaints (Zwerenz et al. 2004). Another important consequences of social stressors at work is sleep fragmentation that escalate the risk of psychosomatic health complaints. Social stressors at work were positively related to objectively assessed sleep fragmentation and to psychosomatic health complaints (Pereira and Elfering 2013).

2.4 Psychosocial hazards

Most of the time, pressure at the workplace is unavoidable due to various work-related circumstances and that subsequently become excessive or unmanageable leading to stress. The cause of work stress in poor work organization is due to the way work is designed and the way it is managed. Work hazards can be broadly divided into physical hazards and psychosocial hazards (Cox et al. 2000). Likewise, work stress can be divided in physical and psychosocial work stressors. Physical work stressors include noise, vibration, poor lighting and ventilation, confined living and working space, adverse offshore weather conditions, long working hours and shift work. And psychosocial stressors comprise job characteristics (work load, variety, clarity, control), perceived risk (fire, explosion, blow out, travelling by helicopter or ships, etc.), job insecurity, and work-family interface (Allen et al. 2001).

Psychosocial risks have been known as major public health problem worldwide. Comprehensive changes in modern working life and significant demographic changes are linked to psychosocial hazards. Work-related stress and workplace violence are commonly recognized major challenges to occupational health and safety (EU-OSHA 2007, Guthrie et al. 2010). Psychosocial hazards are social and organizational contexts at work that have potential for causing psychological, social or physical harm. There are both direct or indirect psychological and physical health effects provoked by psychosocial hazards through the experience of stress (Cox and Griffiths 2005). It is difficult to predict which of the hazards are strongly associated with the experience of stress however psychosocial hazards also have

direct effect in the workers (Cox and Griffiths 1996). Based on previous literatures, the report published by WHO categorized some major stress-related hazards that are harmful at workplace (Leka et al. 2003).

Table 1. Psychosocial hazards at work

<i>PSYCHOSOCIAL HAZARDS</i>	
Job content	Lack of variety or short work cycles, fragmented or meaningless work, under use of skills, high uncertainty, continuous exposure to people through work
Workload & work pace	Work overload or under load, machine pacing, high levels of time pressure, continually subject to deadlines
Work schedule	Shift working, night shifts, inflexible work schedules, unpredictable hours, long or unsociable hours
Control	Low participation in decision making, lack of control over workload, pacing, etc.
Environment & Equipment	Inadequate equipment availability, suitability or maintenance; poor environmental conditions such as lack of space, poor lighting, excessive noise
Organizational culture & function	Poor communication, low levels of support for problem solving and personal development, lack of definition of, or agreement on, organizational objectives
Interpersonal relationships at work	Social or physical isolation, poor relationships with superiors, interpersonal conflict, lack of social support, bullying, harassment
Role in organization	Role ambiguity, role conflict, and responsibility for people
Career development	Career stagnation and uncertainty, under promotion or over promotion, poor pay, job insecurity, low social value to work
Home-work interface	Conflicting demands of work and home, low support at home, dual career problems

Adopted from Leka, Griffiths & Cox (2003)

2.5 Working environment

The issue of the psychosocial work environment has long been of central issue to research on workers' health and safety. Several conceptualizations of work climate perceptions have been developed over the years. Psychosocial risks at workplace have a potential detrimental impact on workers' physical, mental and social health. On the other hand, psychosocial working environment possesses direct and indirect role on organizational health indices like job satisfaction, productivity, absenteeism, sickness absence and intention to quit (Leka and Jain 2010).

Different kinds of physical and psychosocial exposures in the work environment have been found to be associated with work stress. Heavy physical work load, ergonomic conditions and exposures to hazardous substances are associated with sickness absence among the workers (Allebeck and Mastekaasa 2004). The psychosocial environment experienced by overtime workers have both positive and negative dimensions. Overtime is associated with increased workload as a result workers reported greater job demands (like working very fast) and having less time for activities outside of work (difficulty taking day off) (Sauter and Murphy 1995, Cooper et al. 2001).

Poor work organization include the way working systems are designed, together with the way it is managed. Poor work design, for example lack of control over work processes along with poor management mechanisms like unsatisfactory working conditions and lack of support from colleagues and supervisors are very important factors which if managed can prevent work stress at earliest (Putnam and McKibbin 2004, WHO 2013). Poor working environment gives rise to several health effects including common mental disorders, depressive and anxiety disorders (Leka and Jain 2010).

Apart from negative aspect of stress, positive stress at work can be a significant motivating factor in terms of work performance and can drive people to do their best and sometimes, most productive work. Some amounts of stress are good to push to the level of optimal alertness, behavioral and cognitive performance. Workers, when they seek out opportunities that encourage them to reach higher and do better. It's the effect of positive stress that helps them rise to the challenge (Nelson and Simmons 2003, Walton 2013).

2.6 Stress related psychosocial factors at workplace

2.6.1 Working hours and schedules

Overtime work and long working hours are common phenomenon in any occupation. Many studies have explored evidences on long and overtime working hours and its association with different health outcomes like high blood pressure, increased risk of cardiovascular disease, diabetics, disability retirement, anxiety, etc. (van der Hulst 2003, Zolnierczyk-

Zreda, Bedynska et al. 2012, Artazcoz et al. 2013, Bannai and Tamakoshi 2014). Furthermore, overtime works have been found to be associated with mental health problems such as depression and psychological distress (Sparks et al. 1997, van der Hulst 2003).

As described in effort-recovery model by Meijman and Mulder's (Drenth et al. 1998), the probable negative effects of long working hours in terms of health and wellbeing are depended on the possibilities for recovery in the course of working day (internal recovery) and after work (external recovery). During overtime work the time for effort investment is extended, while the time left for recovery after work may be poor due to spillover effects. It is likely that the overtime occurs at the time of high demand situation consequently decreasing the possibilities for internal recovery short break in between. These factors may cause accumulation of fatigue and eventually affect health (Repetti 1989, Chan and Margolin 1994). Lack of proper recovery from workload can be a crucial link between long hours and poor health. Recovery is associated with long, rush and rigid working hours leading to less time for recovery and difficulties in unwinding after work and may result in serious health consequences (Schabracq et al. 2003).

A model by Michel Schuster and Susan Rhodes (Schuster and Rhodes 1985), reported that various intermediary conditions at workplace such as fatigue, stress and drowsiness are due to overtime and long hours that are supposed to increase the risk of workplace accidents (Dembe et al. 2005). The overtime working schedules is associated with a 61% higher injury hazard rate compared to jobs without overtime (Dembe et al. 2005). The effect of long-hour work schedules and nonstandard shift work reported that overtime and long working hours had a greater impact on workplace injury than in the schedules involving night, evening and other nonstandard shift work. Workers returning from occupational injury have difficulties among the nonstandard schedules works especially among overtime and long working hour (Dembe et al. 2007).

2.6.2 Social support and relation with supervisor and colleague

Relation with coworker and support from coworkers play a vital role at workplace. Social support with supervisors and colleagues builds the perception that an individual is a part of a complex network in which one can give and receive affection, aid and obligation (Umberson and Montez 2010). Supervisor's role in maintaining organization and employee relations is vital. Good relation with supervisors and supportive behavior may also

strengthen employees' sense of identity with the broader organizational mission (Aselage and Eisenberger 2003). Stress at workplace occurs in different work circumstances but the situation are often made worse when employees feel little support from supervisors and colleagues and it becomes more difficult to cope with the demands and pressure when they have little control over work (Leka et al. 2004).

Employee's motivation and performance at work, job control, possibilities for development at work, meaning of work and sense of community has been studied over the decades. But some aspects like role clarity and social support from colleagues have studied in a negative way. Yet only two factors - social support from supervisors and quality of leadership are found to have studied in affirmative way (Pejtersen and Kristensen 2009).

Opportunity to exercise any choice or control and support from others highly influences stress at work. Workers' ability to control their work depends upon the support received from supervisors and colleagues and also through their participation in decisions concerned to their job (WHO 2013).

Perceived supervisory support reflects a sense of caring and able to provide emotional assistance at the time of need to the workers. Support received from supervisors and co-workers contribute workers to gain self-esteem, efficacy and integration as termed in effort-reward imbalance. Social exchange theory conceptualize that the workers exchange effort in return of rewards. A study done in Gazel cohort found that the psychosocial factors like support from supervisors and co-workers at work are significant predictive of depressive symptoms for both male and female (Niedhammer et al. 1998).

Workers do not receive esteem, efficacy and integration if there is imbalance hence result psychological distress (Siegrist 1996). Supervisors support also have indirect and moderating role on absenteeism. Supervisory support may aid as a protecting mechanism, easing the strain and other negative consequences associated with adverse work environments (Vaananen et al. 2003). Moral and emotional support by supervisor and coworker's contributes in performance and work output. (Bacharach and Bamberger 2007). Moreover, social support is found to be linked to health related behaviors. Social support is positively associated with more physical exercise and less smoking and alcohol consumption (Allen et al. 2001).

Developing and applying new idea and the feeling of cooperation in team have significant role in an organization. Team which applies strategies to improve their social support as part of a team-building is more likely to build a working, achieving, successful organization, one with effective communication and a shared commitment to team goals and a team vision of success (Rosenfeld and Richman 1997).

2.6.3 Work demand and workers' ability

Research findings show that the most stressful type of work is that which values excessive demands and pressures that are not matched to workers' knowledge and abilities. Employees are less likely to experience work-related stress when demands and pressures of work are matched to their knowledge and abilities. Stress is less likely to occur to those workers who can exercise control over their work and to those workers who regularly receive support from supervisors and colleagues and participate in decisions that concern their jobs (WHO 2013).

Work strain can be defined as jobs characterized by high "psychological workload demands" combined with low "decision latitude" (Schnall et al. 1994). Low social support is associated with higher distress among all sorts of job strain and the collective effect of low social support and high job strain is associated with increase in distress (Vermeulen and Mustard 2000). Psychosocial stress arises as the job demands are high and the job decision latitude is low (Vanagas and Bihari-Axelsson 2005). Decision latitude is considered as the primary factor for work stress which is the combination of job decision making authority and use of skills at work. The jobs which are held by the senior level employees employee are able to bear the significant mental demands (Kristensen et al. 2002).

Construction workers are highly exposed to physically demanding work, such as frequent lifting, awkward postures, static work postures, handling of heavy objects, and unexpected peak loads (Arndt et al. 2005). High physical capacity is associated with good work ability and thereby decreasing the risk of sick leave (Strijk et al. 2011). More strenuous work could be predisposing factors for various health outcomes and leading to absenteeism and low productivity. A study conducted in health care workers explained that moderate and strenuous perceived physical work increases the risk for long term sickness absence in a dose–response manner (Andersen et al. 2012).

2.7 Health risk behaviors

Occupational theories supports that the work stress can affect the workers' health through two mechanisms (Schnall et al. 1994, Israel et al. 1996). The first mechanism seems to be directly that act on the workers stress axes affecting psychophysiological response which involve in pathology and directly stimulating disease mechanisms. Another mechanism acts indirectly, can still affect behavioral habits of workers leading to adoption of unhealthy health behaviors like smoking, alcohol consumption, unhealthy eating habit, physical inactivity. Occupation stress can lead to the adoption of unhealthy behaviors by the workers (Siegrist and Dragano 2008).

Cigarette smoking is the largest preventable risk factor for morbidity and mortality in developed countries (Bergen and Caporaso 1999). Studies suggest that occupational stresses are positively associated with smoking behavior and the number of cigarettes smoked (Brisson, Larocque et al. 2000, Siegrist and Rodel 2006). Occupational stress is also related to worker's alcohol usage. There is close relationship between alcohol dependence and effects on social relationships. Consequently work stress and alcohol consumption may eventually influence performance at work and sickness absence from work (Head et al. 2004). Higher work stress was associated with greater smoking intensity in Finland (Kouvonen et al. 2005).

Several studies found evidence of association of alcohol consumption with shift work, low level of responsibility at work and job insecurity (Cooper et al. 1990, Andrzejczak et al. 2011). There have been few studies that investigated the association between stress at work and the practice of physical activity. Hellerstedt and Jeffery formulated a theory that highly demanding work can reduce workers' willingness or ability to engage in regular physical activity and other types of physical activity (Hellerstedt and Jeffery 1997). Supporting the evidence, a study conducted in Finland revealed an inverse association between job stress and the practice of physical activity in leisure (Kouvonen et al. 2005).

In addition, high-strain jobs eventually promote unhealthy coping behaviors such as smoking that eventually contribute to CVD (Schnall et al. 1994, Brisson et al. 2000, Cassitto and Gilioli 2003, Vanagas and Bihari-Axelsson 2005, Siegrist and Rodel 2006, Chen et al. 2008).

3 AIMS

3.1 Research Question

People are directly or indirectly exposed to work related physical and psychological stress factors. These include work load, pace and schedule as well as interpersonal relations at the workplace. In this thesis the main interest is whether these stress factors are associated with self-reported stress. Further, is the perceived stress associated with work performance, social involvement and health related behavior negatively?

3.2 Main Objective

The main objective of this study is to clarify the associations between psychosocial work stressors and stress. Further, to find associations of stress to its possible consequences.

3.3 Specific Objectives

1. To analyze the association of work schedule with perceived stress by the workers.
2. To study the association of interpersonal relation with workers' perceived stress.
3. To examine the association of perceived stress and work output.
4. To identify the possible health risk behaviors that are associated with workers' perceived stress.

Conceptual Framework

The conceptual framework for this study is presented in Figure 1. Workers are directly and indirectly exposed to different kinds of psychosocial work stressors. The long term exposure to these work-stressors will eventually cause stress among the workers. The work-stress is a potential risk factor to several psychosocial and physical health problems. Apart from these, stress could be associated with decrease in work performance and high absenteeism.

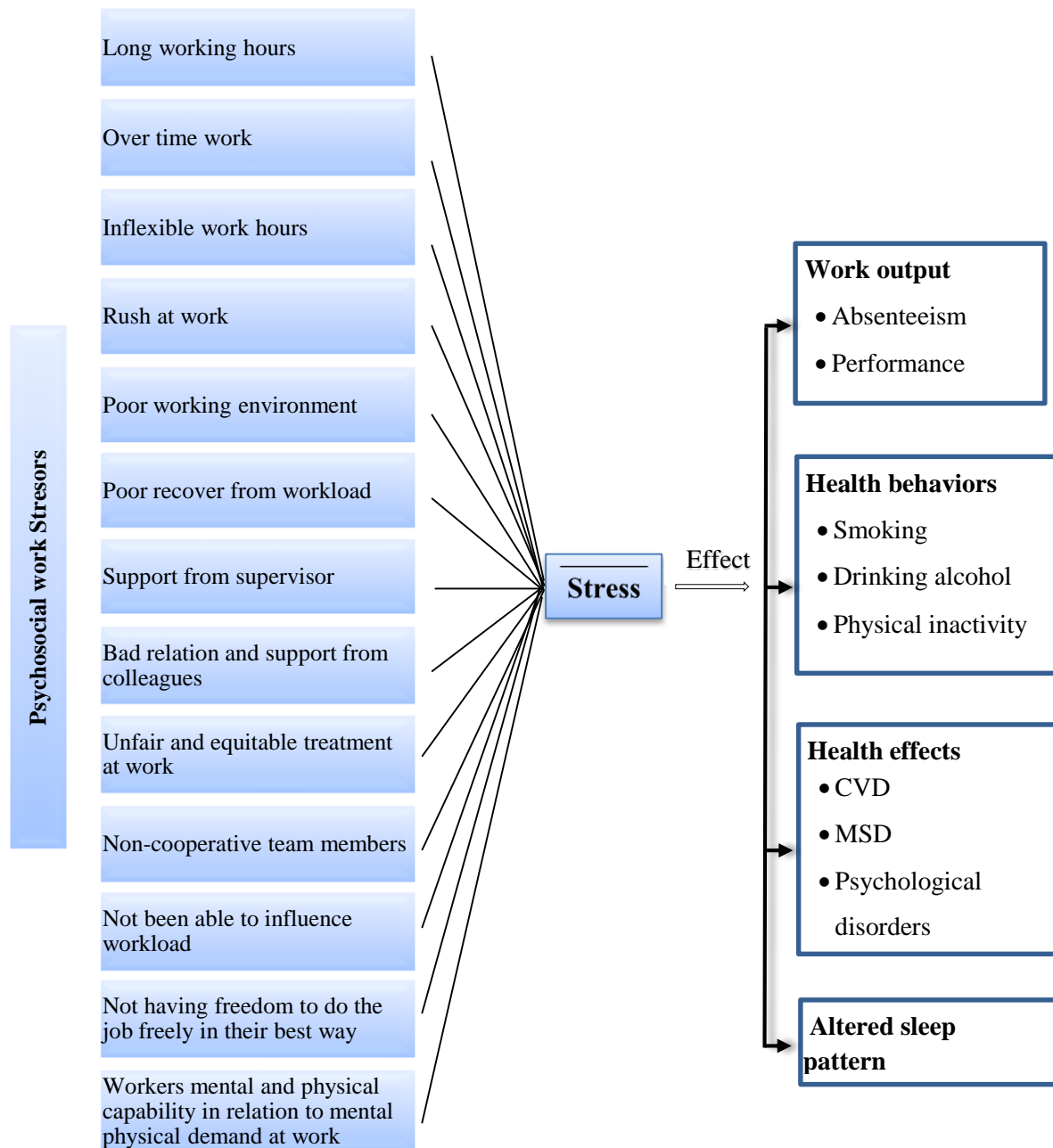


Figure 1. Conceptual framework of the study

4 MATERIALS AND METHODS

4.1 Subjects

The study used secondary data of a study conducted by the Finnish Institute of Occupational Health (FIOH) in the year 2012. The study was entitled “Work and Health in Finland in 2012”, which was a cross-sectional study carried out among the Finnish and Swedish speaking population. Data collection was conducted through telephone interview in three phases. Initially, a total of 12,500 population were randomly selected from the Finnish Population Register. Later 3,315 eligible working population were interviewed, however, the sample was limited to 2,118 due to error occurred during interview process. Participation in the telephone interview was completely voluntary and participants could decide each time separately for their participation. Due to the usability of telephone interview survey instrument in medium to large-scale epidemiological surveys, this tool might have used in this study (Wright 2005, Herr and Ankri 2013).

4.2 Methods

In the study, structured and semi-structured questions were asked to the respondents in order to obtain information. The questionnaire including 198 questions was divided in three sections; ‘All 100’, the ‘First half’ and the ‘Second half’. Out of those questions, 102 questions were designed to be asked to all the respondents, 47 questions to the first half and 49 questions to the second half of the respondents.

Most of the questions were Likert scaled, like never to very often and no to very much. Some of the questions were open ended or based on ranking in a scale of 0 to 10, where 0 was the lowest and 10 the highest value.

Questionnaire included general background information about participants such as gender, age and marital status. Likewise, different types of information on workers’ working environment, workload and overall factors associated with occupational health and safety including stress and psychosocial wellbeing were also included in the questionnaire (appendix II). In this study, the term stress was assessed by a measure of stress symptoms as defined as “Stress means a situation in which a person feels tense, restless, nervous or anxious or is unable to sleep at night because his/her mind is troubled all the time. Do you feel this kind of stress these days” (Elo, Leppanen et al. 2003).

4.3 Statistical analysis

Variables were recoded before analyzing (appendix II). Descriptive statistic (frequencies) method was used to describe baseline characteristics of the participants. Chi-square test were performed to determine the associations and Pearson chi-square test value was used to determine the statistical significance level at $p < 0.05$. Statistical data analysis was performed in SPSS software for Windows, version 19.

5 RESULTS

Out of 2118 total respondents, 53 percent were female. The participant's age varied from 20 to 68 years ages with nearly one third belonging to 50 to 59 age-group. One third of the workers (34%) obtained vocational education followed by technical college or vocational education (30%). Majority of the workers (67%) were permanent employees (table 2).

Table 2. General characteristics of participants

		Frequency	Percent
		N = 2118	
Gender	Male	995	47
	Female	1123	53
Age	20 - 29	319	15
	30 - 39	383	18
	40 - 49	493	23
	50 - 59	668	31
	60 - 69	255	12
Education	Basic education	440	21
	Vocational education	713	34
	Technical college or vocational college	647	30
	University or University of applied sciences	318	15
Occupation*	Permanent	1425	67
	Fixed term	293	14
	Irregular	43	2

*Missing = 357

5.1 General characteristics of participants and perceived stress

In total, 8.9% of the workers reported quite a lot of stress out of which female experienced more often stress than male workers. Workers with higher education (technical and university education) reported to have quite a lot of stress more frequently. However, no associations were observed between workers' current job and work status with the perceived stress (table 3).

Table 3. General characteristics of participants in relation to their perceived stress

		Stress			Total N=2118	p- value
		No n=696 (32.9%)	Somewhat n=1233 (58.2%)	Quite a lot n=189 (8.9%)		
Age group (N=2118)	20 - 29	118 (37.0)	168 (52.7)	33 (10.3)	319	0.35
	30 - 39	125 (32.6)	227 (59.3)	31 (8.1)	383	
	40 - 49	143 (29.0)	296 (60.0)	54 (11.0)	493	
	50 - 59	210 (31.4)	402 (60.2)	56 (8.4)	668	
	60 - 69	100 (39.2)	140 (54.9)	15 (5.9)	255	
Gender (N=2118)	Male	351 (35.3)	578 (58.1)	66 (6.6)	995	0.001
	Female	345 (30.7)	655 (58.3)	123 (11.0)	1123	
Marital Status* (N=2112)	Unmarried	154 (37.1)	222 (53.5)	39 (9.4)	415	0.085
	Married or cohabiting or living with a partner	460 (31.5)	877 (60.1)	122 (8.4)	1459	
	Separated or divorced	67 (34.5)	102 (52.6)	25 (12.9)	194	
	Widow	14 (31.8)	27 (61.4)	3 (6.8)	44	
Highest education (N=2118)	Basic education	151 (34.3)	257 (58.4)	32 (7.3)	440	0.000
	Vocational education	258 (36.2)	404 (56.7)	51 (7.2)	713	
	Technical college or vocational college	198 (30.6)	379 (58.6)	70 (10.8)	647	
	University or University of applied sciences	89 (28.0)	193 (60.7)	36 (11.3)	318	
Current job** (N=1761)	Permanent	451 (31.6)	849 (59.6)	125 (8.8)	1425	0.296
	Fixed term	110 (37.5)	156 (53.2)	27 (9.2)	293	
	Irregular	15 (34.9)	23 (53.5)	5 (11.6)	43	
Work status (N=2118)	Employee	579 (32.7)	1036 (58.4)	158 (8.9)	1773	0.920
	Independent contractor/ entrepreneur	87 (33.0)	154 (58.3)	23 (8.7)	264	
	Farmer	30 (37.0)	43 (53.1)	8 (9.9)	81	

*Missing number 6

**Missing number 357

5.2 Work schedule and stress

Workers working 50 or more hours per week were found to have quite a lot of stress more often as compared to the workers working less hours ($p=0.011$). Workers having monthly overtime work in last 12 months also reported to have quite a lot stressed than those with less frequent and no overtime ($p=0.042$). Similarly, workers with daily and weekly flexible

working hours as requested by the supervisor, experienced quite a lot of stress as compared to the workers with monthly flexible working hours ($p=0.00$) (table 4).

No significant association was observed in case of overtime hours in a month regardless of compensation. Work schedules including night and weekend shifts were not associated with the worker's perceived stress (Appendix II: table 2).

Table 4. Association of work schedules in relation to stress

		Stress			Total N	p-value
		No n (%)	Somewhat n (%)	Quite a lot n (%)		
Main working hrs, without overtime (N=2036 [*])	Less than 20 hrs	42 (38.9)	56 (51.9)	10 (9.3)	108	0.011
	20 to 39 hrs	361 (33.0)	632 (57.8)	100 (9.1)	1093	
	40 to 49 hrs	216 (35.4)	352 (57.6)	43 (7.0)	611	
	50 or more hrs	51 (22.8)	147 (65.6)	26 (11.6)	224	
Total		670 (32.9)	1187 (58.3)	179 (8.8)	2036	
Overtime work within last 12 months (N=813 ^{**} #)	Monthly	61 (25.8)	141 (59.7)	34 (14.4)	236	0.042
	Less frequently than monthly	78 (31.3)	150 (60.2)	21 (8.4)	249	
	Not at all	110 (33.5)	193 (58.8)	25 (7.6)	328	
Total		249 (30.6)	484 (59.5)	80 (9.8)	813	
Flexible work hours requested by the supervisor (N=1771 ^{***})	Daily	27 (21.4)	78 (61.9)	21 (16.7)	126	0.000
	Weekly	92 (22.9)	252 (62.7)	58 (14.4)	402	
	Monthly	451 (37.2)	687 (56.7)	74 (6.1)	1212	
	Never	10 (32.3)	18 (58.1)	3 (9.7)	31	
Total		580 (32.7)	1035 (58.4)	156 (8.8)	1771	

*Missing number 82

**Missing number 316

***Missing number 347

asked to the first half of respondents

5.3 Stress and rush, recovery and nature of work at workplace

Workers who experienced quite often rush at work perceived quite a lot of stress and the workers with poor recovery from workload more often reported to have stress quite a lot. Workers were found more stressed if they have strenuous nature of ($p=0.000$) (table 5).

Table 5. Association between rush, recovery and nature of work at workplace with stress

		Stress			Total N	p-value
		No n (%)	Somewhat n (%)	Quite a lot n (%)		
Rush at work (N=2115*)	Not usually	303 (49.9)	280 (46.1)	24 (4.0)	607	0.000
	Sometimes	202 (29.1)	460 (66.2)	33 (4.7)	695	
	Quite often	190 (23.4)	492 (60.5)	131 (16.1)	813	
Total		695 (32.9)	1232 (58.3)	188 (8.9)	2115	
Recover from workload (N=2112**)	Good	495 (43.2)	612 (53.4)	38 (3.3)	1145	0.000
	Moderate	186 (21.7)	572 (66.7)	100 (11.7)	858	
	Poor	14 (12.8)	46 (42.2)	49 (45.0)	109	
Total		695 (32.9)	1230 (58.2)	187 (8.9)	2112	
Nature of work (N=2112***)	Light	359 (45.5)	400 (50.7)	30 (3.8)	789	0.000
	Burdensome	203 (27.4)	493 (66.6)	44 (5.9)	740	
	Strenuous	131 (22.5)	337 (57.8)	115 (19.7)	583	
Total		693 (32.8)	1230 (58.2)	189 (8.9)	2112	

*Missing number 3

**Missing number 6

***Missing number 6

The more tensed and tight working climate, the more stressed workers ($p=0.000$). Unlikely, workers who have quite often encouraging and supportive climate to generate new ideas at work reported to have less perceived stress ($p=0.004$). Workers with bad relation with their colleague found to have quite a lot stress as compared to the workers who had very good relation with colleagues ($p=0.000$). Likewise, very much support from coworkers was found to be associated with less stress among workers as compared with very less support (table 6).

Table 6. Association between working climate and workers' stress

		Stress			Total N	p-value
		No n (%)	Somewhat n (%)	Quite a lot n (%)		
Working climate (N=894*#)	More tensed and tight	31 (23.7)	69 (52.7)	31 (23.7)	131	0.000
	More relaxed and comfortable	249 (32.6)	464 (60.8)	50 (6.6)	763	
Total		280 (31.3)	533 (59.6)	81 (9.1)	894	
Working climate (N=873**#)	More encouraging and supportive of new ideas	184 (31.6)	359 (61.6)	40 (6.9)	583	0.004
	More prejudiced and old patterns	84 (29.0)	166 (57.2)	40 (13.8)	290	
Total		268 (30.7)	525 (60.1)	80 (9.2)	873	
Relation with colleagues (N= 1913***)	Very good	561 (33.5)	987 (58.9)	129 (7.7)	1677	0.000
	Neither good nor bad	31 (22.0)	91 (64.5)	19 (13.5)	141	
	Bad	23 (24.2)	45 (47.4)	27 (28.4)	95	
Total		615 (32.1)	1123 (58.7)	175 (9.1)	1913	
Support from coworkers (N=1911****)	Very much	515 (32.9)	932 (59.5)	120 (7.7)	1567	0.000
	Moderately	76 (28.1)	159 (58.9)	35 (13.0)	270	
	Very little	21 (28.4)	33 (44.6)	20 (27.0)	74	
Total		612 (32.0)	1124 (58.8)	175 (9.2)	1911	

*Missing number 235

**Missing number 256

***Missing number 205

****Missing number 207

Asked to first half of respondents

5.4 Supervisor's role and stress

Workers with very little support from supervisor at workplace were found to have quite a lot of stress ($p=0.000$). Similarly, supervisor's fair and equitable treatment to workers was associated with less stress among workers. Those workers who rarely get needed information were found to have stress quite often than the worker who always received the information ($p=0.000$) (table 7).

Table 7. Association between supervisor's role and stress

		Stress			Total N	p-value
		No n (%)	Somewhat n (%)	Quite a lot n (%)		
Support from supervisor (N=1728*)	Very much	406 (35.4)	668 (58.3)	72 (6.3)	1146	0.000
	Moderately	116 (28.4)	249 (60.9)	44 (10.8)	409	
	Very little	41 (23.7)	96 (55.5)	36 (20.8)	173	
Total		563 (32.6)	1013 (58.6)	152 (8.8)	1728	
Fair and equitable treatment by supervisor (N=1645**)	Always	196 (39.5)	272 (54.8)	28 (5.6)	496	0.000
	Often	282 (26.9)	666 (63.4)	102 (9.7)	1050	
	Not usually	28 (28.3)	53 (53.5)	18 (18.2)	99	
Total		506 (30.8)	991 (60.2)	148 (9.0)	1645	
How often supervisor gives information needed (N=1712***)	Always	431 (35.5)	705 (58.1)	78 (6.4)	1214	0.000
	Occasionally	65 (23.4)	177 (63.7)	36 (12.9)	278	
	Rarely	67 (30.5)	120 (54.5)	33 (15.0)	220	
Total		563 (32.9)	1002 (58.5)	147 (8.6)	1712	

*Missing number 390

**Missing number 473

***Missing number 406

5.5 Team work and stress

Those team members who daily seek fresh and new ways of approaching problems were found to have experienced less often stressed ($p=0.019$) as compared to those who rarely seek. Likewise, the team members who rarely felt cooperation to develop and apply new ideas were found to have stressed quite a lot ($p=0.004$) (table 8).

Table 8. Association between team work and stress

		Stress			Total N	p-value
		No n (%)	Somewhat n (%)	Quite a lot n (%)		
Team members seek fresh, new ways of approaching problems (N=1755*)	Daily	86 (35.0)	140 (56.9)	20 (8.1)	246	0.019
	Weekly	188 (31.4)	366 (61.1)	45 (7.5)	599	
	Monthly	139 (27.7)	319 (63.7)	43 (8.6)	501	
	Rarely	131 (32.0)	225 (55.0)	53 (13.0)	409	
Total		544 (31.0)	1050 (59.8)	161 (9.2)	1755	
Team members feel cooperative to develop and apply new idea (N=1798**)	Almost always	138 (36.1)	211 (55.2)	33 (8.6)	382	0.004
	Occasionally	336 (29.1)	722 (62.6)	95 (8.2)	1153	
	Rarely	94 (35.7)	137 (52.1)	32 (12.2)	263	
	Total	568 (31.6)	1070 (59.5)	160 (8.9)	1798	

*Missing number 363

**Missing number 320

5.6 Worker's role and stress

Those workers who can influence their workload to very little extent observed to have quite a lot of stress as compared to those who can influence to great extent ($p=0.005$). Similarly, workers who rarely have freedom to do their job freely in their best way reported to have quite a lot of stress as compared to those who often had freedom ($p=0.000$) (table 9).

Table 9. Association between worker's role and stress

		Stress			Total N	p-value
		No n (%)	Somewhat n (%)	Quite a lot n (%)		
Workers can influence workload (N=2107*)	To great extent	218 (32.2)	416 (61.4)	44 (6.5)	678	0.005
	Little	222 (33.5)	387 (58.4)	54 (8.1)	663	
	Very little	250 (32.6)	425 (55.5)	91 (11.9)	766	
Total		690 (32.7)	1228 (58.3)	189 (9.0)	2107	
Workers have freedom to do the job freely in their best way (N=2098**)	Daily	538 (36.8)	827 (56.6)	97 (6.6)	1462	0.000
	Weekly	131 (25.0)	334 (63.9)	58 (11.1)	523	
	Monthly	12 (21.8)	33 (60.0)	10 (18.2)	55	
	Rarely	10 (17.2)	27 (46.6)	21 (36.2)	58	
Total		691 (32.9)	1221 (58.2)	186 (8.9)	2098	

*Missing number 11

**Missing number 20

5.7 Workers mental and physical capability and stress

Workers with poorer mental capability than it is required at work were found to have quite a lot of stress. Similarly, good physical capability of workers that match with the required physical capability at work was associated with less perceived stress among those workers with good physical capability ($p=0.000$) (table 10).

Table 10. Association between worker's mental and physical capability in relation to stress

		Stress			Total N	p-value
		No n (%)	Somewhat n (%)	Quite a lot n (%)		
Workers mental capability against the mental demands at work (N=2116*)	Good	650 (36.1)	1053 (58.5)	97 (5.4)	1800	0.000
	Moderate	41 (15.6)	161 (61.5)	60 (22.9)	262	
	Poor	4 (7.4)	18 (33.3)	32 (59.3)	54	
Total		695 (32.8)	1232 (58.2)	189 (8.9)	2116	
Workers physical capacity against current physical demand at work (N=2113**)	Good	598 (34.3)	1020 (58.6)	124 (7.1)	1742	0.000
	Moderate	81 (26.4)	183 (59.6)	43 (14.0)	307	
	Poor	14 (21.9)	28 (43.8)	22 (34.4)	64	
Total		693 (32.8)	1231 (58.3)	189 (8.9)	2113	

*Missing number 2

**Missing number 5

5.8 Stress, absenteeism and work performance

Those workers who were absent for longer days (10 and more) due to health problems were found to have quite a lot of stressed ($p=0.000$). Work output was also found to have associated with the perceived stress of workers. Workers with excellent work performance were observed to have quite a lot of stress as compared to the workers with moderate and bad work performance ($p=0.048$) (table 11).

Table 11. Association of stress absenteeism and work performance

		Stress			Total N	p-value
		No n (%)	Somewhat n (%)	Quite a lot n (%)		
Days been absent due to health last six months (N=2118)	Not been absent	383 (37.1)	589 (57.1)	60 (5.8)	1032	0.000
	1 to 3 days	140 (32.3)	257 (59.4)	36 (8.3)	433	
	4 to 9 days	84 (28.4)	181 (61.1)	31 (10.5)	296	
	10 & more days	89 (24.9)	206 (57.7)	62 (17.4)	357	
Total		696 (32.9)	1233 (58.2)	189 (8.9)	2118	
Work output (N=971*##)	Bad (1-4)	0	5 (83.3)	1 (16.7)	6	0.048
	Moderate (5-8)	31 (20.9)	101 (68.2)	16 (10.8)	148	
	Excellent (9-10)	258 (31.6)	489 (59.9)	70 (8.6)	817	
Total		289 (29.8)	595 (61.3)	87 (9.0)	971	

*Missing number 158

#Asked to the second half of respondents

5.9 Stress and overall health behaviors

Overall health behaviors like smoking and alcohol drinking and exercise habits were not associated with the worker's perceived stress. However, workers' drinking habit for at least 6 servings at one occasion was observed to have association with quite a lot of stress ($p=0.044$) (table 12).

Table 12. Association between stress and overall health behaviors

		Stress			Total N	p-value
		No n (%)	Somewhat n (%)	Quite a lot n (%)		
Smoking (N=1088*##)	Never smoked	168 (32.4)	308 (59.3)	43 (8.3)	519	0.101
	Stopped smoking	94 (39.2)	130 (54.2)	16 (6.7)	240	
	Smoking irregularly	13 (46.4)	12 (42.9)	3 (10.7)	28	
	Smoking daily	92 (30.6)	174 (57.8)	35 (11.6)	301	
Total		367 (33.7)	624 (57.4)	97 (8.9)	1088	
Alcohol drinking (N=1085**##)	Never	54 (36.7)	84 (57.1)	9 (6.1)	147	0.186
	Monthly or less frequently	126 (31.9)	240 (60.8)	29 (7.3)	395	
	2 to 4 times per month	150 (35.0)	235 (54.9)	43 (10.0)	428	
	2 to 4 times per week	36 (31.3)	63 (54.8)	16 (13.9)	115	
Total		366 (33.7)	622 (57.3)	97 (8.9)	1085	
Drink for at least 6 servings at one occasion (N=884**##)	Never	55 (26.7)	125 (60.7)	26 (12.6)	206	0.044
	Monthly	163 (28.5)	361 (63.2)	47 (8.2)	571	
	Weekly, almost on daily basis	24 (35.8)	32 (47.8)	11 (16.4)	67	
	Total	242 (28.7)	518 (61.4)	84 (10.0)	844	

*Missing number 1030

**Missing number 1033

***Missing number 245

##Asked to second half of respondents

5.10 Stress and sleeping hours

In case of sleeping hours during work days, those workers with 5 or less hours of sleep were found to have quite a lot of stress than the workers with more hours of sleep ($p=0.003$) (table 13).

Table 13. Association between hours of sleep during workdays and stress

		Stress			Total N	p-value
		No n (%)	Somewhat n (%)	Quite a lot n (%)		
Sleep during work days (N=1969*)	5 or less hrs	26 (32.5)	38 (47.5)	16 (20.0)	80	0.003
	6 to 8 hrs	581 (32.2)	1077 (59.7)	147 (8.1)	1805	
	9 and more hrs	33 (39.3)	45 (53.6)	6 (7.1)	84	
Total		640 (32.5)	1160 (58.9)	169 (8.6)	1969	

*Missing number 149

6 DISCUSSION

6.1 *Main findings*

This study showed that the factors like working hours, workload and work schedules were significantly associated with workers' perceived. Workers with more than 50 hours of work per week and overtime hours within last 12 months were found to have be more stressed. The findings are in accordance with the study done formerly (Niedhammer et al. 1998, Stansfeld 2002, Harma 2006). Strong association was found between working hours and measures of health and well-being, particularly for respondents with the higher overtime work (Grosch et al. 2006). At the same time, overtime workers reported generally higher levels of participation in decision making and the opportunity to develop their special abilities, two variables often thought to be important in creating a positive work climate (Ochsmann et al. 2011).

Positive association was observed in case of regular inflexible work hours requested by the supervisor and stress among workers. A very high level of depression was found in the oldest group of men working long inflexible hours (Zolnierczyk-Zreda et al. 2012). And especially female workers who have children may experience stress working in inflexible environments. Furthermore, workers with more flexible work arrangements are able to take better care of their health than those without flexible work time (Grice et al. 2008).

This study showed that worker's rush at work and poor recovery from workload is significantly associated with their perceived stress. Repeated and incomplete recovery after work may lead to chronic load reactions and poor health in the long run (Geurts and Sonnentag 2006).

The result of this thesis suggested that the relation and support from coworkers can influence the stress level among workers. As purposed by Mayfield et al. 1998, moral and emotional support by supervisor and coworkers were significantly associated with coworker's support, motivation and performance (Cropanzano et al. 2003). These factors are also inversely related with the stress and health problems and absenteeism (Stephens 2000, Cropanzano et al. 2003). Similar, study done among Chinese workers concluded that the psychosocial factors like support from both supervisors and friends positively associated with workers perceived stress (Chen et al. 2008).

One of the important results of this study suggests that the supervisor's roles like support and information provided to the workers along with fairly and equitably treatment to workers were associated with workers perceived stress level. Studies (Bromet et al. 1992, Kawakami et al. 1992) have shown that colleagues' and supervisors' high levels of social support at work have been found to be protective of mental health. Support from supervisors is more important in mental health than support from colleagues, that however depends upon workplace (Stansfeld et al. 1999).

This study result showed that workers' excellent work performance was found to be responsible for quite a lot of stress; more work performance, more stressed the workers. Performance of workers depends upon the role of coworkers and supervisors that may lead to common mental health disorders. Employees who work as part of a team may need to accomplish extra work competently, that can leads to develop stress, and consequently results reduced productivity. Moreover, mental illness may bring about "spillover" effects on the individual's family members, who may have employed or involved in other social responsibilities (Dewa et al. 2007).

In general psychosocial stress can contribute to the change in negative health behaviors like smoking and alcohol drinking. This study showed no association with the worker's perceived stress with smoking and drinking habits. However drinking for at least 6 servings at one occasion showed association with worker's stress. This may be due to several socio-economic and demographic factors linked to smoking and drinking behaviors and many study have found mixed findings. Similar association was obtained by Chinese study, where workers' current smoking was negatively related with perceived stress in relation with lack of supervisors' instrumental support (Chen et al. 2008). Likewise, some studies have also found negative association between workers stress and smoking behavior (Brisson et al. 2000, Lindstrom 2004, Kouvonen et al. 2005), but positive association was observed in case of current drinking and perceived stress (Chen et al. 2008). A study done among white collar workers found only partial support for an association between some psychosocial factors at work and the prevalence of smoking and sedentary behavior (Brisson et al. 2000).

Similarly, this study did not find any association with workers' stress and exercise habit. Similar association was obtained by (Chen et al. 2008), the physical inactivity after work was positively associated with perceived stress from safety and lack of instrumental support from both supervisors and friends (Chen et al. 2008).

Result in this study showed that sleep of five hours or less was found to be associated with quite a lot of stress. A study with similar findings correlated high stress with disturbances in sleep duration and sleep quality. Also, stress-sleep may be an important mechanistic mediator of the association between stress and CVD (Kashani et al. 2012).

6.2 Material and methods

The data for this thesis was obtained from the nationwide coverage study conducted by FIOH. The survey incorporated large sample size incorporating workers from various occupations. This study included various aspects of stress-related questions and its possible psychosocial consequences which can generate association between stress and its possible outcomes. The questions were well organized and clear instructions were given so that the participants get clear idea about question. However, the study encountered high non-response rates. This could be caused by the use of telephone survey instruments. Apart from its convenient and widely used surveys tools, it also serves as a more cost-effective and rapid-screening cognitive tools (Rabin et al. 2007). On the other hand, telephone based survey is condemned regarding validity of the data and sampling issues (Tiene 2000, Wright 2005).

6.3 Strength and weakness

This is the nationally representative study of Finnish working population of overall 2118 workers. FIOH has been conducting survey since 1997 in three years interval and over the time the study tools has been strengthened and updated. The questions used in this telephone survey were extensive enough to retrieve information regarding aspects of occupational health, psychosocial factors and working conditions.

Nevertheless, the data could not provide complete picture of workforce in Finland as the study did not include the migrant workers. Although the study incorporated large sampling frame, only 2118 population fully participated in the survey after excluding 60% participants due to non-response rate. Furthermore, 1097 respondents were removed from the results due to mistakes during the interview process. The study is susceptible to bias due to the occurrence of a high non-response rate that could have resulted by the use of telephone based survey instrument. Due to the concern about confidentiality, this instrument often have issue

of high non-response rate (Sax et al. 2003). Large involvement of population close to retirement age (above 50 years) may have generated skewed findings. As the older age participants already have longer exposure to work factors, this may have caused misclassification and reduced the strength of association.

Use of self-reported data to classify the stress and other psychosocial factors are more or less a subjective issue. This may cause temporal change in the accuracy of self-reported measurement than compared to clinical measurement (Shiely et al. 2010). Hence, there is also chance that this study is subject to recall bias. The cross-sectional study design on other hand, limits the implication of study outcome that can only generate the prevalence rate.

The findings of this thesis can be generalizable to Finnish work life and could be used as an evidence in occupational health care system. The result can be useful in creating an awareness at large to small scale workplace regarding psychosocial work factors that are directly and indirectly provoke stress among workers and to minimize the possible risk factors.

7 CONCLUSIONS AND RECOMMENDATIONS

The study examined the association of workers' perceived stress with the possible work stressors and the association with the stress and its possible consequences in health behaviors.

1. Work schedules like long working hours, overtime work and flexible work requested by supervisors were associated with a perceived stress. These factors should be taken into account when planning working hours in order to organize sufficient recovery.
2. Interpersonal relation with colleagues and supervisors along with team members' cooperative and problem solving approaches were more often associated with workers' perceived stress. Good work environment and good interpersonal relationship among workers and supervisor can eventually lower the stress at workplace.
3. Workers with excellent work performance were more often observed to have quite a lots of stress and the workers who remain absent for longer days due to health problems were found to have quite a lot of stress. The results imply that in order to minimize the worker's stress, there should be balance between work performance and health and hence absenteeism due to health conditions can be minimized.
4. The findings suggested that workers' perceived stress have no association with possible health risk behaviors like smoking and drinking alcohol except with drinking habit for at least 6 serving at a time. These behaviors nevertheless have confounded as these are inter-related with several socio-economic factors.

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9 APPENDIX I

Interview form

The questions used in this study, and recoding of the original questions.

all-100

b1

Gender

Original	Recoded
1 Male	original
2 Female	

all-100

B1b

In what year were you born? 1944-1992 year of birth

Original	Recoded
[write the year of birth]	20 - 29
	30 - 39
	40 - 49
	50 - 59
	60 - 69

all-100

k1

Are you

Original	Recoded
1 unmarried	original
2 married or cohabiting	
3 separated or divorced	
4 widowed?	

all-100

b2u

What is the highest level of education you have completed: completed, not current

Original	Recoded
1 not completed education	Basic education (1, 2, 3, 4)
2 primary education	Vocational education (5, 6)
3 comprehensive or middle school	Technical college or vocational college (7)
4 upper secondary school	University or University of applied sciences (8, 9)
5 vocational course or training at work	
6 vocational school (also registered apprenticeship courses)	
7 vocational College	
8 Polytechnic or first university degree	

9 university or college
10 other, what? Open ended question

all-100**b6**

Are you working in your main employment?

Original	Recoded
1 wage earner or salaried employee	original
2 entrepreneur, self-employed	
3 or farmer?	

all-100**b20pr**

wage earners or salaried employees (if b6=1)

Is your present job

Original	Recoded
1 permanent, including indefinite contracts	Permanent (1)
2 fixed term project, agreed up to a fixed day	Fixed term (2, 3)
3 other fixed term, agreed up to a fixed day	Irregular (4, 5)
4 agency work	
5 or other irregular job?	

all-100**b15**

any

What is the time you spend at work, not including overtime?

Original	Recoded
1-85 hours / week	Less than 20 hrs
	20 to 39 hrs
	40 to 49 hrs
	50 or more hrs

all-100**b26**

wage earners and salaried employees

How often do you have to be flexible in your working times either because the work requires it or your supervisor asks you to?

Original	Recoded
1 daily	daily (1)
2 weekly	weekly (2)
3 monthly	Monthly (3)
4 more rarely	never (4, 5)
5 or never	

all-100**f2**

any

Next I would like to ask about how strenuous your work is. Is your work physically strenuous?

Original	Recoded
1 light	light (1, 2)
2 fairly light	burdensome (3, 4)
3 a bit strenuous	strenuous (5)
4 quite strenuous	
5 or very strenuous?	

all-100

j4

any

Is your work mentally, including the social load?

Original	Recoded
1 light	light (1)
2 fairly light	burdensome (2, 3)
3 a bit strenuous	strenuous (4, 5)
4 quite strenuous	
5 or very strenuous?	

all-100

f20u

Do you get over the stress caused by your work after the working day or shift? Both mental and physical stress

Original	Recoded
1 well	Good (1)
2 moderately	Moderate (2)
3 or badly	Poor (3)

all-100

j2

Next I would like to ask about your work and working community. How often do you have to rush to get work done?

Original	Recoded
1 never	not usually (1, 2)
2 fairly rarely	sometimes (3)
3 now and again	quite often (4, 5)
4 quite often	
5 or very often?	

all-100

J13

What about the amount of work? Can you influence it at your place of work?

Original	Recoded
----------	---------

1 to a great extent	to great extent (1, 2)
2 quite a lot	little (3)
3 a little	very little (4, 5)
4 not much	
5 or very little?	

all-100**Y31**

those employees, who have superior (if b6 = 1 and b14spb = 1,2,3)

Does your boss give you by his/her own initiative the information you need to get your job done well

Original	Recoded
1 always	always (1, 2)
2 quite often	occasionally (3, 4)
3 occasionally	rarely (5)
4 uncommonly	
5 hardly ever	

all-100**J19**

There are also others at the workplace or in the organisation. Do you receive support and help from your colleagues when you need it?

Original	Recoded
1 to a great extent	very much (1, 2)
2 quite a lot	moderately (3, 4)
3 a little	very little (5)
4 not much	
5 or very little?	

all-100**j20**

Those employees who have a line manager. Do you get help and support from your line manager?

Original	Recoded
1 to a great extent	very much (1, 2)
2 quite a lot	moderately (3, 4)
3 a little	very little (5)
4 not much	

all-100**y12**

There are also others at the workplace or in the organisation. Do your team members collaborate in developing and applying new ideas?

Original	Recoded
1 almost always	almost always (1, 2)
2 quite often	occasionally (3, 4)
3 occasionally	rarely (5)
4 uncommonly	
5 hardly ever	

all-100**y10**

There are also others at the workplace or in the organisation. Do your team members try to find fresh, new ways of approaching problems?

Original	Recoded
1 daily	daily (1)
2 weekly	weekly (2)
3 monthly	monthly (3)
4 more rarely	rarely (4, 5)
5 or never?	

all-100**j21b**

employees

There are also others at the workplace or in the organisation. Does your immediate line manager deal with employees fairly and equally?

Original	Recoded
1 always	always (1, 2)
2 very often	often (3)
3 quite often	not usually (4)
4 fairly rarely	
5 or never?	
6 I do not have a line manager	

all-100**j1**

any

By stress we mean a situation in which a person feels themselves to be excited, restless, nervous or uneasy or they may find it difficult to sleep because they constantly have things on their mind. Do you currently feel this kind of stress?

Original	Recoded
1 not at all	no (1)
2 very little	somewhat (2, 3)
3 a little	quite a lot (4, 5)
4 quite a lot	
5 or a lot?	

all-100**t9**

any

How many days have you be off work during the past six months because of your state of health? During the past 6 months. Absence due to maternity leave is not to be included, A working week is generally 5 days, normal rounding

Original	Recoded
0-183 days	Not been absent
	1 to 3 days
	4 to 9 days

all-100

y22*any*

How many days have you been working while ill during the last six months?

Original	Recoded
0-183 days	not been absent 1 to 3 days 4 to 9 days 10 & more days

all-100**t11***any*Assume that your working capacity at its best would receive 10 points. How many points on a scale of 1-10 would you give your present working capacity? *0 means that you are not able to work at all at the moment.*

Original	Recoded
0-10 points	bad (1-4) moderate (5-8) excellent (9-10)

all-100**t12***any*

Is your present working capacity as far as the physical demands are concerned?

Original	Recoded
1 very good	good (1, 2)
2 quite good	moderate (3)
3 moderate	bad (4, 5)
4 quite bad	
5 very bad	

all-100**t13***any*

Is your present working capacity as far as mental demands are concerned?

Original	Recoded
1 very good	good (1, 2)
2 quite good	moderate (3)
3 moderate	bad (4, 5)
4 quite bad	
5 very bad	

b16c2_cc*employees,*

During the last 12 months have you done any overtime without compensation, Unpaid overtime is the same thing as work without compensation, Overtime refers to overtime at the main job

Original	Recoded
1 monthly	Original

2 less frequently than monthly
3 or not at all?

If monthly, how many hours a month on average?

Original	Recoded
1-200 hours	1 to 9 hours 10 to 19 hours 20 to 29 hours 30 and more hours

One-half

b17cx

any

Does your job involve working nights? At least 1 hour between the hours of 23.00 and 06.00

1 weekly

Original	Recoded
1 weekly	weekly (1)
2 At least once a month	less frequently in a month (2, 3)
3 less frequently than monthly	not at all (4)
4 or not at all?	

One-half

b17dx

any

Does your job involve working weekends?

Original	Recoded
1 a few weekends a month	few weekend of month (1)
2 at least one Saturday or Sunday a month, or both	at least one Saturday and Sunday (2)
3 less frequently than monthly	less frequently (3)
4 or not at all?	no at all (4)

One-half

J23

There are also others at the workplace or in the organisation. Is the atmosphere at your place of work?

Original	Recoded
1 more supportive and encouraging of new ideas	more encouraging and supportive of new ideas
2 or more prejudiced and holding fast to old ways of doing things?	more prejudiced and fast to old ways

One-half

j49u

There are also others at the workplace or in the organisation. Is time used to develop new ideas at your workplace?

Original	Recoded
1 always	almost always (1, 2)
2 very often	occasionally (3)

3 quite often	rarely (4)
4 fairly rarely	
5 or never?	

Two half-**N2B**

If you engage in exercise (if n2a = 2)

How often you exercise in your free time?

Original	Recoded
1 four or more days a week	4 or more days per week
2 three days a week	2 to 3 days a week
3 two days a week	once a week
4 once a week	few times a year
5 1-3 times a month	
6 a few times a year	

Two half-**n4**

any

Do you smoke or have you smoked?

Original	Recoded
1 I have never smoked	never smoked (1)
2 I gave up over 6 months ago	stopped smoking (2)
3 I gave up smoking occasionally less than 6 months ago	smoking irregularly (3, 4)
4 I gave up smoking daily less than 6 months ago	smoking daily (5, 6)
5 I smoke but not every day	
6 I smoke daily	

Two half-**n5u1**

any

How often do you drink alcohol?

Original	Recoded
1 never	never (1)
2 monthly or less	monthly or less frequently (2)
3 2-4 times a month	2 to 4 times a month (3)
4 2-3 times a week	2 to 4 times a week (4, 5)
5 four times a week or more	

Two half-**n6u**

if the use of alcohol (if n5u1 = 2-5)

How often do you drink at least 6 units at one time?

Original	Recoded
1 never	never (1, 2)
2 less frequently than monthly	monthly (3)
3 monthly	weekly, almost daily (4, 5)
4 weekly	
5 almost daily	

10 APPENDIX II

Table 1. Association between monthly overtime works (with compensation) in relation to stress

		Stress			Total N	p-value
		No n (%)	Somewhat n (%)	Quite a lot n (%)		
Hours of overtime work per month (compensated) (N=232 * * #)	1 to 9	33 (29.7)	63 (56.8)	15 (13.5)	111	0.600
	10 to 19	13 (21.3)	37 (60.7)	11 (18.0)	61	
	20 to 29	4 (14.3)	19 (67.9)	5 (17.9)	28	
	30 and more	9 (28.1)	20 (62.5)	3 (9.4)	32	
Total		59 (25.4)	139 (59.9)	34 (14.7)	232	

* Missing number 757

#Asked to first half of respondents

Table 2. Association between night and weekends work to workers' stress

		Stress			Total N	p-value
		No n (%)	Somewhat n (%)	Quite a lot n (%)		
Night work (N=1019 * * #)	Weekly	30 (35.3)	50 (58.8)	5 (5.9)	85	0.696
	Less frequently in a month	60 (33.7)	100 (56.2)	18 (10.1)	178	
	Not at all	234 (31.0)	453 (59.9)	69 (9.1)	756	
Total		324 (31.8)	603 (59.2)	92 (9.0)	1019	
Weekend work (N=1023 * * #)	Few weekend of month	77 (31.6)	142 (58.2)	25 (10.2)	244	0.195
	At least one Saturday and Sunday	47 (34.1)	79 (57.2)	12 (8.7)	138	
	Less frequently	64 (33.7)	108 (56.8)	18 (9.5)	190	
	No at all	138 (30.6)	276 (61.2)	37 (8.2)	451	
Total		326 (31.9)	605 (59.1)	92 9.0	1023	

* Missing number 6

* * Missing number 2

#Asked to the first half of respondents

Table 3. Association between stress and exercise habit

		Stress			Total N	p-value
		No n (%)	Somewhat n (%)	Quite a lot n (%)		
Exercise (N=1065 * ##)	4 or more days per week	71 (35.1)	116 (57.4)	15 (7.4)	202	0.596
	2 to 3 days a week	134 (30.7)	265 (60.6)	38 (8.7)	437	
	Once a week	42 (35.9)	66 (56.4)	9 (7.7)	117	
	Few times a year	97 (31.4)	177 (57.3)	35 (11.3)	309	
Total		344 (32.3)	624 (58.6)	97 (9.1)	1065	

* Missing number 64

##Asked to the second half of respondents