

Marjo Sinokki

Social factors at work and the health of employees



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Social factors at work and the health of employees

Tiivistelmä

Sosiaaliset tekijät työssä ja työntekijöiden terveys

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Abstract

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Depression, anxiety, alcohol use disorders, and sleeping difficulties are common problems among the working population. These disorders and symptoms also incur remarkable expense to society. The association between social support and team climate at work and various outcomes were studied in a sample of working population ($n = 3347\text{--}3430$) derived from the Health 2000 Study of the National Institute for Health and Welfare. Social support at work was measured using the Job Content Questionnaire (JCQ), and support in private life with the Social Support Questionnaire. Team climate was measured using a self-assessment scale, which is included in the Healthy Organization Questionnaire. The diagnoses of common mental disorders were based on the Composite International Diagnostic Interview. The prescriptions of antidepressants and hypnotics and sedatives were extracted from the prescription register of the Social Insurance Institution of Finland, and the disability pensions were extracted from the official records of the Finnish Centre of Pensions and the Social Insurance Institution. There was no difference between gender and the perceived team climate. Instead, women perceived more social support, both at work and in private life. Low social support, both at work and in private life, was associated with depressive and anxiety disorders and many sleep related problems. Poor team climate was associated with both depressive and anxiety disorders. Low social support from supervisors and from co-workers was associated with subsequent antidepressant use. Poor team climate also predicted antidepressant use during the follow-up. Low social support from the supervisor seemed to increase the risk for disability pension. It is important to pay attention to the well-being of employees at work since low social support and poor team climate are associated with mental health problems and future work disability.

Keywords: social support, team climate, mental disorders, sleep problems, antidepressants, hypnotics and sedatives, disability pension, well-being at work, occupational health, depression, anxiety, drinking problems, men, women, sexual distinctions, employees

Tiivistelmä

Sinokki M. **Sosiaaliset tekijät työssä ja työntekijöiden terveys**. Helsinki: Kela, Sosiaali- ja terveysturvan tutkimuksia 115, 2011. 147 s. ISBN 978-951-669-851-2 (nid.), ISBN 978-951-669-852-9 (pdf).

Masennus, ahdistuneisuus, alkoholiriippuvuus ja alkoholin väärinkäyttö sekä unihäiriöt ovat yleisiä ongelmia työssä käyvän väestön keskuudessa. Nämä sairaudet ja oireet aiheuttavat huomattavia kuluja myös yhteiskunnalle. Sosiaalisen tuen ja työilmapiirin yhteyttä työssä käyvien (n = 3 347–3 430) terveyteen tutkittiin Terveyden ja hyvinvoinnin laitoksen Terveys 2000 -aineistossa. Sosiaalista tukea työssä mitattiin JCQ-kyselyllä (Job Content Questionnaire) ja yksityiselämän sosiaalista tukea SSQ-kyselyllä (Social Support Questionnaire). Työilmapiiriä mitattiin kyselyllä, joka on osa Terve työyhteisö -kyselyä. Mielenterveyshäiriöiden diagnoosit perustuivat CIDI-haastatteluun (Composite International Diagnostic Interview). Tiedot lääkärin määräämistä masennus- ja unilääkkeistä poimittiin Kelan lääkerekisteristä ja tiedot työkyvyttömyyseläkkeistä Eläketurvakeskuksen ja Kelan rekistereistä. Ilmapiirin kokemisessa ei ollut merkitsevää eroa sukupuolten välillä. Sen sijaan naiset kokivat saavansa sosiaalista tukea enemmän sekä työssä että yksityiselämässä. Vähäinen sosiaalinen tuki sekä työssä että yksityiselämässä oli yhteydessä masennukseen, ahdistuneisuushäiriöihin ja moniin uniongelmiin. Huono työilmapiiri oli yhteydessä sekä masennukseen että ahdistuneisuushäiriöihin. Vähäinen tuki sekä esimiehiltä että työtovereilta oli yhteydessä myöhempään masennuslääkkeiden käyttöön. Huono työilmapiiri ennusti myös masennuslääkkeiden käyttöä. Vähäinen sosiaalinen tuki esimieheltä näytti lisäävän työkyvyttömyyseläkkeen todennäköisyyttä. Työhyvinvointiin täytyy kiinnittää huomiota, koska vähäinen sosiaalinen tuki ja huono työilmapiiri ovat yhteydessä mielenterveysongelmiin ja lisäävät työkyvyn menettämisen riskiä. – Yhteenvedo s. 89–90.

Avainsanat: sosiaalinen tuki, työilmapiiri, mielenterveyshäiriöt, uniongelmat, masennuslääkkeet, unilääkkeet, työkyvyttömyyseläke, työhyvinvointi, työterveys, masennus, ahdistuneisuushäiriöt, alkoholi-ongelmat, miehet, naiset, sukupuolierot, työntekijät

Sammandrag

Sinokki M. **Sociala faktorer i arbetet och arbetstagarnas hälsa.** Helsingfors: FPA, Social trygghet och hälsa: Undersökningar 115, 2011. 147 s. ISBN 978-951-669-851-2 (hft.), 978-951-669-852-9 (pdf).

Depression, ångest, alkoholberoende och -missbruk samt sömnstörningar är allmänna problem bland den yrkesverksamma befolkningen. Dessa sjukdomar och symptom förorsakar också betydande kostnader för samhället. Sambandet mellan socialt stöd och arbetsklimat å ena sidan och den yrkesverksamma befolkningens hälsa å den andra (n = 3347–3430) studerades i undersökningen Hälsa 2000 vid Institutet för hälsa och välfärd. Socialt stöd i arbetet mättes med JCQ-förfrågan (Job Content Questionnaire) och socialt stöd i privatlivet med SSQ-förfrågan (Social Support Questionnaire). Arbetsklimatet mättes med en förfrågan som ansluter sig till enkätundersökningen Sund Arbetsgemenskap. De diagnoser som gällde psykisk ohälsa grundade sig på CIDI-intervju (Composite International Diagnostic Interview). Uppgifterna om läkarordinerade depressions- och sömnläkemedel insamlades ur Folkpensionsanstaltens läkemedelsregister och uppgifterna om sjukpensioner ur Pensionsskyddscentralens och Folkpensionsanstaltens register. Beträffande hur klimatet upplevdes fanns ingen signifikant skillnad mellan könen. Däremot upplevde kvinnorna att de fick mer socialt stöd både i arbetet och i privatlivet. Lågt socialt stöd i såväl arbete som privatliv hängde samman med förekomsten av depression, ångest och sömnproblem. Dåligt arbetsklimat hade kopplingar både till depression och ångest. Lågt socialt stöd från såväl chefer som medarbetare hade samband med senare bruk av depressionsläkemedel. Dåligt arbetsklimat predicerade också bruk av depressionsläkemedel. Lågt socialt stöd från chefen tycktes öka sannolikheten för sjukpension. Välbefinnandet i arbetet måste ägnas uppmärksamhet eftersom lågt socialt stöd och dåligt arbetsklimat har samband med psykisk ohälsa och ökar risken att förlora arbetsförmågan.

Nyckelord: socialt stöd, arbetsklimat, mentala störningar, sömnproblem, depressionsläkemedel, sömnläkemedel, sjukpension, arbetshälsa, arbetshygien, depression, ångest, alkoholproblem, män, kvinnor, könsskillnader, arbetstagare

FOREWORD AND ACKNOWLEDGEMENTS

The idea to carry out this research has its origins in my work experience as a physician in occupational health. Gradually, my attention started to focus on the psychosocial factors at work. I often wondered what the reasons were that employees in some workplaces wanted to continue working regardless of their many serious illnesses or disabilities, and employees in some other workplaces perceived even smaller limitations in their health as insurmountable impediments, leading to a loss of desire for work and later also to the loss of the ability to work.

This study was carried out at the Departments of Public Health and Occupational Health, at the University of Turku, and at the Turku Centre for Occupational Health. For me, the dissertation process has been an adventure into the world of science. During this educational adventure, there have been feelings of success, wonderful discoveries and experiences, but also some moments of desperation and feelings of being completely lost. I would like to express my sincere gratitude to all those excellent people with whom I have been privileged to share this wonderful adventure.

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Lieto, Yliskulma, 2011

Marjo Sinokki

*So in everything,
do to others what you would have them do to you,
for this sums up the Law and the Prophets.
Matt. 7:12*

CONTENTS

LIST OF ORIGINAL PUBLICATIONS	11
ABBREVIATIONS	12
1 INTRODUCTION AND REVIEW OF THE LITERATURE	13
1.1 Psychological stress	13
1.2 Work stress theories.....	15
1.3 Health and work ability	16
1.4 Mental health and sleep.....	19
1.4.1 The epidemiology of mental disorders in Finland.....	19
1.4.2 The epidemiology of sleeping problems in Finland.....	20
1.5 Societal aspect	20
1.5.1 The use of antidepressants and of hypnotics and sedatives	21
1.5.2 Disability pensions.....	22
1.6 Social factors at work	23
1.6.1 The concept of social support	23
1.6.2 Measuring social support	26
1.6.3 Research on social support and the health of employees	27
1.6.4 Research on social support at work and the health of employees	29
1.6.5 The concept of work team climate	37
1.6.6 Measuring work team climate	38
1.6.7 Research on work team climate and the health of employees	38
1.7 Gaps in previous research	41
2 PRESENT STUDY	42
2.1 Framework of the study	42
2.2 Aims of the study	43
3 METHODS	45
3.1 Procedure	45
3.2 Participants	46
3.3 Measures.....	47
3.3.1 Social support at work.....	47
3.3.2 Social support in private life	47
3.3.3 Team climate at work.....	48
3.3.4 Mental disorders.....	48
3.3.5 Sleeping problems	52
3.3.6 Psychotropic medication.....	52
3.3.7 Disability pensions.....	52
3.3.8 Socio-demographic factors	53
3.3.9 Other covariates.....	53
3.4 Statistical analyses	54

4 RESULTS	56
4.1 Association of social factors at work with mental health and sleeping problems.....	60
4.1.1 Mental disorders (Studies I and II)	60
4.1.2 Sleeping problems (Study III)	60
4.2 Societal aspect	64
4.2.1 Antidepressant use (Studies I and II).....	64
4.2.2 Use of hypnotics and sedatives (Study III).....	68
4.2.3 Disability pensioning during the follow-up period (Study IV)	68
5 DISCUSSION	72
5.1 Synopsis of the main findings.....	72
5.2 Social factors at work associated with mental disorders	72
5.2.1 Social support and mental disorders	73
5.2.2 Work team climate and mental disorders	75
5.3 Social factors at work associated with sleeping problems	76
5.4 Social factors at work from a societal aspect	78
5.4.1 Use of antidepressants and hypnotics or sedatives	78
5.4.2 Work disability	80
5.5 Evaluation of the study.....	81
5.5.1 Common evaluation	81
5.5.2 Assessment of social support	82
5.5.3 Assessment of team climate	82
5.5.4 Assessment of outcomes	83
5.5.5 Major strengths.....	83
5.5.6 Study limitations.....	83
5.6 Conclusions and policy implications	85
5.6.1 Conclusions	85
5.6.2 Implications for future research	86
5.6.3 Policy implications	86
SUMMARY	87
YHTEENVETO	89
REFERENCES	91
ORIGINAL PUBLICATIONS	107

LIST OF ORIGINAL PUBLICATIONS

This review is based on the following four original publications. The original articles are referred to in the text with the Roman numerals (I–IV).

- I** **Sinokki M, Hinkka K, Ahola K et al.** The association of social support at work and in private life with mental health and antidepressant use. The Health 2000 Study. *J Affect Disord* 2009; 115: 36–45.
- II** **Sinokki M, Hinkka K, Ahola K et al.** The association between team climate at work and mental health in the Finnish Health 2000 Study. *Occup Environ Med* 2009; 66: 523–528.
- III** **Sinokki M, Ahola K, Hinkka K et al.** The association of social support at work and in private life with sleeping problems in the Finnish Health 2000 Study. *J Occup Environ Med* 2010; 52: 54–61.
- IV** **Sinokki M, Hinkka K, Ahola K et al.** Social support as a predictor of disability pension. The Finnish Health 2000 Study. *J Occup Environ Med* 2010; 52: 733–739.

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ABBREVIATIONS

ACTH	Adrenocorticotrophic hormone
APGAR	Adaptation, Partnership, Growth, Affection, and Resolve Questionnaire
ATC	Anatomical Therapeutic Chemical (ATC) classification system
AWS	Areas of Worklife Scale
BMI	Body mass index (kg/m ²)
CES-D	Center for Epidemiologic Studies Depressive Symptoms Scale
CI	Confidence interval
CIDI	Composite International Diagnostic Interview
CRH	Corticotropin-Releasing Hormone
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders, IV Edition
ERI	Effort-Reward Imbalance
FINJEM	Finnish Job Exposure Matrix
GAS	General Adaptation Syndrome
GHQ	General Health Questionnaire
GJSQ	Generic Job Stress Questionnaire
HPA axis	Hypothalamus-pituitary-adrenal cortex axis
ISEL	Interpersonal Support Evaluation List
ISSI	Interview Schedule for Social Interaction
JCQ	Job Content Questionnaire
MDCSQ	Malmö Diet and Cancer Study Questionnaire
OR	Odds ratio
OS12	Occupational Stress Indicator
OSQ	Occupational Stress Questionnaire
PSE	Present State Examination
PSI	Psychiatric Symptom Index
QPSNordic	General Nordic Questionnaire for Psychological and Social Factors at Work
SF-36	SF-36 Health Survey
SII	Social Insurance Institution of Finland
SSQ	Social Support Questionnaire
SSQS	Social Support Questionnaire for Satisfaction
SSQT	Social Support Questionnaire for Transactions
TCI	Team Climate Inventory
WHO	World Health Organization

1 INTRODUCTION AND REVIEW OF THE LITERATURE

During the past decades, the association between psychosocial factors at work and employees' health has been studied actively. Despite the present economic crisis in Finland, there is a shortage of labour force in many sectors. The ageing of the population has created a need to keep employees in the labour market for as long as possible, and has also emphasised the importance of occupational health in maintaining the ability to work and in prolonging careers (OECD 2010). However, the global economy and increasing demands in working life have changed the psychosocial characteristics of work (Landsbergis 2003), which contribute to the well-being of employees.

Good social relations at work are important resources for health but, if problematic, these factors may also cause strain on employees. Strain may manifest with physical, mental, and social problems and functional disorders. Long lasting or intensive strain may become detrimental to one's health. The worsening of health causes not only human suffering but also high societal costs.

The evidence that social support is beneficial to health and that the lack of it leads to ill health is considerable. Yet, the exact nature of the association of social support with clinically significant mental disorders and work disability remains scarce. Team climate includes also aspects of social support at work. Team climate has been studied to a far lesser extent than social support. This study was made in order to evaluate the importance of social support at work on the mental health and work disability of employees, as well as to look at these relationships in the context of the team climate at work.

1.1 Psychological stress

The term *stress* is used to mean either an individual reaction (the response definition), the environmental force causing such a reaction (the stimulus definition), or both the environmental causes and the individual's reaction (the interactional, transactional and process definitions) (Lazarus and Folkman 1984). For the stress response, it has been suggested that the term strain could be used to avoid confusion over the term stress (Cooper 1998). In any case, the relationship between the individual and the environment is a common thread in the scientific discourse of stress (Wainwright and Calnan 2002).

The observation that organisms react biologically to a number of different stimuli in the same way was the origin of stress research. This reaction, called the General Adaptation Syndrome (GAS), was preceded by studies of the "fight or flight" reaction mechanism by Cannon in the 1920s. Emotional and physiological stress responses are essentially biologically determined instincts, which ensure the survival of the human organism in a hostile environment. Stress responses are divided into physiological responses (e.g. pulse, blood pressure, hormonal secretion), psychological responses

(e.g. emotions, attitudes, symptoms of mental illnesses, cognitions), and behavioural responses (e.g. job performance, absenteeism) (Cooper 1998). Strain includes emotions (e.g. anxiety, fear), physiological reactions (e.g. adrenaline response, fatigue, heart rate), and mental disorders (e.g. depression) (Karasek and Theorell 1990). However, the emotional response has often been thought to be the starting point in the development of stress reactions (Cooper 1998).

Emotional reactivity is the key to understanding the aetiology, expression, and course and outcome of disorders, as well as to understanding the promotion of health and well-being. However, emotions are plastic and multidimensional rather than fixed and clear-cut, and many research methods have relied on different verbal accounts of emotions, which presuppose that individuals understand the descriptions identically and that they can identify their emotional states. The cultural factors of the emotion descriptions, gender differences in the expression of emotions, the variety of emotions, and the differences between individuals in their ability to identify their own emotional states, have been important challenges in research. (Buunk 1990.)

In a stress situation, the system of hypothalamus-pituitary-adrenal cortex axis (HPA axis) is activated. The hypothalamus releases corticotropin-releasing hormone (CRH) and CRH releases an adrenocorticotrophic hormone (ACTH) from the anterior pituitary. ACTH stimulates the secretion of glucocorticoids, such as cortisol, from the adrenal cortex. In stress, the axis of HPA is over activated, which stimulates the system. In depressive disorders the HPA axis is over activated. Antidepressants and therapy also affect this axis. The stimulation contributes to induce a person to focus his/her energy in a challenging situation, but long-lasting or intensive stress may become adverse to health (Seasholtz 2000).

Interactional definitions of work stress started with a main criticism towards the stimulus – response model of stress being unable to explain why some environmental stress factors get only some individuals to affect. In interactional stress models individual characteristics are mediators between environmental stimuli and the response of the individual. The focus of interactional models has been in the role of the characteristics of the individual (type A personality, hardiness, negative affectivity, self-esteem), capabilities (the perceived health or work ability of the individual), and needs or expectations. (Lazarus and Folkman 1984.)

The transactional definition of stress included also the active role of the individual to respond to the environment selectively, changes in the environment and the individual within the interaction, and the context in which the meeting of the environment and the individual takes place. Three basic types of stressful appraisals are harm or loss, threat of harm, and challenge. Environmental conditions that may lead to appraising an encounter as stressful are novelty, predictability, event uncertainty, imminence, duration, temporal uncertainty, ambiguity and timing over the life cycle. Secondary appraisal focuses on available coping resources, which may be environmental and personal. Personal resources are health, energy, positive beliefs, problem-solving skills,

and social skills. Environmental resources are social support and material resources, such as money, goods, and services. (Lazarus and Folkman 1984.) It has been suggested that the individual's cognitive appraisal of the situation determines whether a situation is stressful or not. The transactional definition of stress is widely acknowledged as the most advanced model of stress (Cooper 1998). However, the idea of a separation of the individual from the environment dominates in work stress research.

1.2 Work stress theories

The sources of the stress response have been focused on by some studies in stress research. The environment has been thought to be a key element, as the source of stress-producing stimuli and sources of well-being or ill-being depend on the environmental conditions existing outside the individual. Earlier experimental work with physical and chemical stressors was expanded to include psychological and social stressors. This has also increased emphasis on the prevention of stress rather than just on finding the cure for it. At the workplace, task-related stressors, as well as stressors related to the organisational structure, climate and career development were identified (Cooper and Crump 1978).

The psychological job demands and the decision latitude at work are common job characteristics thoroughly researched by many researchers. One of the most famous stress theories is the demand-control model of work stress, called the Job Strain Model (Karasek 1979; Krause et al. 1997; Krokstad et al. 2002), which was later complemented with a third job characteristic, namely social support at work. According to this theory, stress at work is caused by high demands, low decision latitude, a combination of these resulting in job strain, and lack of social support. Social support referred to the availability of helpful social interaction at work, both from co-workers and supervisors (Karasek and Theorell 1990). The moderating effect of social support has received mixed support from empirical studies.

A more recent work stress theory is the effort-reward imbalance model (ERI model), explaining the influences of work stress with disproportion between efforts and rewards (Siegrist 1996). The efforts may be psychological and physical demands or obligations of the job (the amount of work, work pace, lifting, bending, etc.), and the occupational rewards may be money, esteem and promotion prospects, including job security. Esteem from supervisors and co-workers links the ERI model to the research on social support at work. According to this model, high efforts with low rewards predict the most adverse emotional and health outcomes. Lack of reciprocity between efforts and rewards elicits strong negative emotions, with a particular propensity to sustained autonomic and neuroendocrine activation, and adverse long-term consequences for health.

Lately, the theory of justice has been used to explain work stress. According to this theory, unfairness in management, both in decision and treatment, causes stress and

subsequent health problems. Organisational injustice is a factor causing stress in today's rapidly changing work life. Justice includes two components, procedural and relational justice. Procedural justice concerns the extent to which decision-making procedures guarantee fair and consistent decisions, whereas relational justice describes the extent to which employees are treated with respect and fairness by their supervisors and co-workers (the polite, considerate, and fair treatment of individuals). Thus, justice theory includes several elements of social support and team climate. In several recent epidemiological studies, organisational injustice has been related to feelings, behaviours in social interaction, and adverse health (Elovainio et al. 2001; Elovainio et al. 2002; Kivimäki et al. 2003; Kivimäki et al. 2005; Elovainio et al. 2006a; Elovainio et al. 2006b; Ferrie et al. 2006; Kivimäki et al. 2006; Kivimäki et al. 2007).

Effort-reward imbalance at work among men, and low decision latitude among women have been related to alcohol dependence (Head et al. 2004), while job-related burnout has been associated with alcohol dependence in both sexes (Ahola et al. 2006). Low procedural justice at work has been shown to be weakly associated with an increased likelihood of heavy drinking (Kouvonen et al. 2008), unlike other stressful work conditions, which have shown no association with problematic alcohol use (Kouvonen et al. 2005).

1.3 Health and work ability

Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (WHO 1946), but a traditional medical disease model of ill-health has mostly been applied in the research to date (Schaufeli 2004). According to Smith (1981), in the concept of health, there are four viewpoints: clinical, role-function, adaptive, and eudemonistic modes. The clinical mode is defined as absence of the signs or symptoms of disease or disability and identified by medical science. It includes, for instance, health status as well as physical and psychological symptoms and responses. The role-function mode is defined as the performance of social roles with a maximum expected output. It includes role function, behaviours, and role burden. The adaptive mode is defined as the individual maintaining flexible adaptation to the environment, and interacting with the environment to a maximum advantage. It includes both physical and psychosocial adjustment, adjustment of life, coping behaviour, and stress. The eudemonistic mode is defined as exuberant well-being. It includes health belief, health promotion behaviour, quality of life, well-being, and self-actualisation. (Smith 1981.)

Most often health is operationalised on biomedical grounds. Health might be seen to have three aspects (Table 1): objective, empirical, and social (Kat 1995).

Table 1. *Issues associated with the three dimensions of health.*

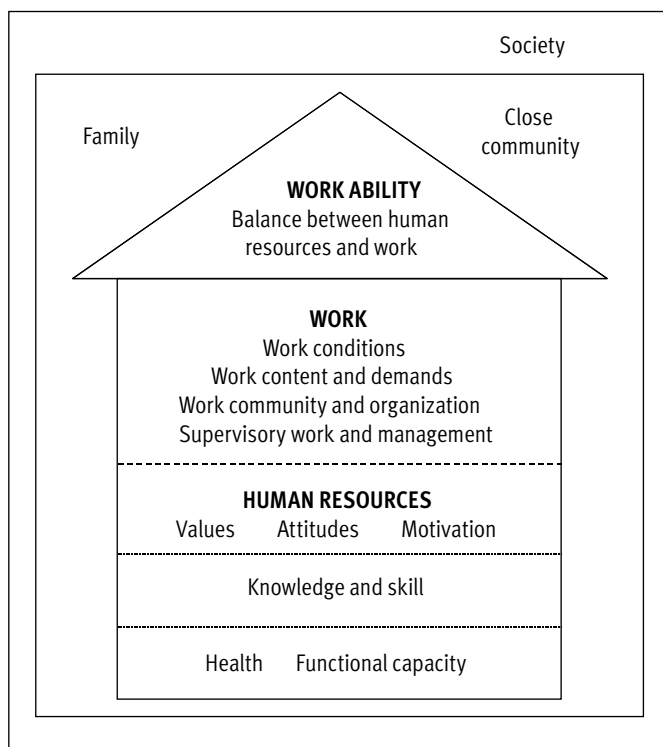
	'Observable' dimension	Experimental dimension	Social dimension
Acute state	Disease	Illness	Sickness
Recognized by	Signs	Symptoms	Dependence/deviance
Chronic state	Impairment	Disability	Handicap
Excellent health	Fitness	Wellbeing	Role fulfilment
Service indicator	Need	Demand	Complaints about excellent dependence/deviance
Rationing by	Redefining Legitimacy	Management of demand	Care management

Source: Kat 1995.

Ill-health has often been defined as a discrepancy between the individual and the environment (Tinsley 2000). According to the traditional medical disease model, health and work ability are assessed via the defects, injuries, and disorders of the employee. The concept of work ability has changed along with the whole of society. Work ability is associated with nearly all factors of work life, whether related to the individual, the workplace or the immediate social environment or society (Gould et al. 2008; Nordenfelt 2008). Work ability cannot be analysed only according to the characteristics of the individual, but the work and the work environment must also be taken into consideration. Many different health care or social insurance professionals or other experts may assess work ability, but usually an employee and his/her supervisor also have their own views on the work ability of the employee. Work ability is often thought to be composed of four factors; the employee's health and competence, the work environment, and the work community. The dimensions of work ability from the point of view of human resources, work, and the environment are seen in Figure 1 (p. 18) (Ilmarinen 2006).

Usually work and occupational stress create strain within the employee, and the quality and level of the strain is also regulated by his/her resources. The level of an employee's strain is affected by the interactions between factors of the work community and the employee. The negative strain is often studied, but the strain may also be positive and maintain and develop the resources of the employee. In the multidimensional work ability model, seen in Table 2 (p. 18), coping at work, having control over one's work, and participating in the work community, are important dimensions of work ability (Järvikoski et al. 2001). So, among other things, social skills are an important part of work ability, affecting also the co-workers' work ability.

Figure 1. Dimensions of work ability from the point of view of human resources, work, and the environment.



Source: Ilmarinen 2006.

Table 2. Multidimensional work ability model: coping, control, participation.

Worker		Work	Task of the work organization and functional environment
Physical and mental capacity, endurance	Coping at work ↔	Physical and mental strain of the work process or work conditions (resources and weaknesses)	Business concept, solutions for the distribution of work tasks, work conditions and processes in the organization
Occupational skills and competence	Control over one's work ↔	Cognitive prerequisites and skills for the work process; possibilities to affect work, learn from work and develop in work	Occupational roles and their cognitive and skill prerequisites; equipment; personnel's opportunities to influence, learn and develop
General skills in the worklife and social skills; skill in applying for work; interests	Participation in the work community ↔	Prerequisites for surviving in the work community; opportunities to participate socially; social support; diversity of work roles	Organization's values and attitudes (e.g., acceptance of diversity and multiculturalism); atmosphere of the work community; practices concerning recruiting and promoting careers

Source: Järvikoski et al. 2001.

In order to have the capacity to work efficiently, it is necessary that the employee has the work specific manual and the intellectual competence (technical, general, and personal competence), strength, toleration and courage, relevant virtues (honesty, loyalty), motivation, willingness to cooperate with and support co-workers, other qualifications, and the physical, mental and social health that are required to fulfil the tasks and reach the goals which belong to the job in question, assuming that the physical, psychosocial and organisational work environment is acceptable (Nordenfelt 2008). Work disability is multifactorial and may relate to the worker, the workplace (design or organisation), the compensation system, the healthcare system and the local culture and politics. Disease and disability are two different concepts that are often poorly related (Loisel 2009). The duration of sickness absence correlates poorly with the medical severity of the disease. Financial compensation (insurance systems) and management of such absences are regulated by private or public systems, and vary considerably from one country to another. (Loisel et al. 2009.)

In a medical insurance context, the reduced ability of an individual to do his or her work is attributable to a medical condition. The Finnish National Insurance Act states that a person who cannot perform more than 60% of his or her work duties because of some medical disability is entitled to economic compensation (Statistical Yearbook of the Social ... 2006).

1.4 Mental health and sleep

1.4.1 *The epidemiology of mental disorders in Finland*

According to two large surveys among the Finnish population, the prevalence of depression seems not to have changed. In the survey, called the Mini-Finland Health Survey and carried out from 1978-1980, the age-adjusted prevalence of all diagnosed mental disorders was over 17 per cent and that of depressive, non-psychotic, disorders was 4.6 per cent (Lehtinen et al. 1991). According to a study made 20 years later, the Health 2000 Study, 4.9 per cent of the adult population had suffered from one or more episodes of major depression during the preceding 12 months, and the overall prevalence of depressive disorders showed a prevalence of 4.3 per cent (Pirkola et al. 2005). The assessment of mental health disorders was made with a standardised interview in both studies; namely the Present State Examination (PSE) in the Mini-Suomi Study and the Composite International Diagnostic Interview (CIDI) in the Health 2000 Study.

In the Health 2000 Study, the prevalence of major depression among the working population was 5.6%. There was a significant difference between employed and unemployed persons; among the unemployed the prevalence of major depression was 9.5% (Honkonen et al. 2007). There was also a significant gender difference; 9% of employed women and 4% of men suffered from major depression. However, the Finnish Health Care Surveys suggested that in 1995 and 1996 psychic symptoms were substantially more common among adults than in 1987 (Arinen et al. 1998). According to the

Health 2000 Study, 6.3% of employed women, and 4.5% of employed men suffered from anxiety. About 10% of employed men and 2% of women had an alcohol use disorder (Aromaa and Koskinen 2004). Alcohol causes about 7% of the whole burden of sicknesses, almost 3,000 alcohol deaths as well as almost 3,000 consequential deaths per year in Finland (Kauhanen et al. 1997; Mäkelä et al. 1997; Lunetta et al. 2001).

1.4.2 The epidemiology of sleeping problems in Finland

The prevalence of sleeping problems, depending on their definition, is between 5% and 48% in the adult population in the western world (Ohayon 2002). According to DSM-IV (Diagnostic and Statistical Manual of Mental Disorders version IV) criteria, the prevalence of insomnia was 11.7% among Finnish adults in 2003 (Ohayon and Partinen 2002). In Finland and in Sweden, work-related sleeping problems increased rapidly from 1995 to 2000, whereas in many countries, for example in Germany and Southern Europe, no comparable change occurred (Third European Survey ... 2001).

1.5 Societal aspect

Although the prevalence of mental disorders has not clearly increased in the adult population in Finland, mental health problems seem to cause much more deficiencies in ability to work than earlier. It has been suggested that the major changes in working life have been an important reason for the increasing disability rates (Gould et al. 2008). Employees are expected to continuously learn new things, adapt themselves to changes, and manage a large amount of complexities. They are expected to have good cognitive skills in interaction, skills to take responsibility, and to have a good tolerance for conflicts and uncertainty. Mental disorders may weaken the ability to concentrate and maintain attention, weaken learning and memory, aggravate decision-making, delay psychomotor action, and weaken the positive assessment of their own performance of duties (Nordenfelt 2008).

The costs of sickness absences and disability pensions due to mental disorders have increased approximately 1.5-fold during the last ten years in Finland (Gould et al. 2008). Refunds of charges for medicines also cause remarkable costs to the whole society, just as presenteeism, i.e. those workers who stay at work but who have a lower productivity due to health problems, causes remarkable costs to enterprises. Work disability is an individual and societal problem with important health and financial consequences. Evidence suggests the need to adopt a broader disability paradigm that takes into account the complex interaction of biological, psychological and social aspects and interplays involving employer, insurer, and healthcare providers who interact with the employee during the disability process. Non-medical factors are often more likely to explain long-term disability. (Loisel 2009.)

The number of sickness allowance days, paid by the Social Insurance Institution, due to depression has increased between 1996 and 2007 (Statistical Yearbook of the Social ... 1997 and 2008). The paid sickness allowance days due to anxiety disorders has also increased up to the year 2008. In sicknesses caused by alcohol, it is possible to get sickness allowance paid by the Social Insurance Institution usually only when alcohol has already caused organ damage, for example to the brain, liver or pancreas, reflecting a quite excessive use of alcohol. The number of sickness absence days paid by the Social Insurance Institution due to alcohol-caused disorders has increased up to the year 2003, and then decreased. It is estimated that about 7% of the whole burden of sicknesses is caused by alcohol, with more than 5,000 alcohol and consequential deaths per year in Finland (Kauhanen et al. 1997; Mäkelä et al. 1997; Lunetta et al. 2001). Alcohol disorders cause increased risks and trouble at work. In 1995, about 17% of sickness absence days were due to mental disorders and, in 2003, about 25% (Statistical Yearbook of the Social ... 1997; Statistical Yearbook of the Social...2008). Since then, the percentage of 25% has remained constant. Paid sickness absence days due to sleeping disorders have increased dramatically during 1996–2008. The growth stopped in 2008, maybe partly due to the financial recession (Statistical Yearbook of the Social ... 1997; Statistical Yearbook of the Social ... 2008).

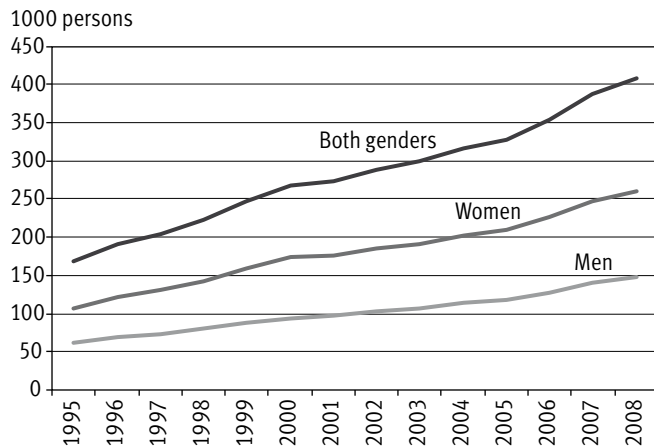
1.5.1 The use of antidepressants and of hypnotics and sedatives

The use of antidepressants has increased 7-fold from 1990 to 2005 (Klaukka 2006; Finnish Statistics on Medicines 2009). In 2006, more than 300,000 Finnish people used antidepressants, 8% of women and 5% of men. The number of persons refunded for the costs of antidepressants by the national sickness insurance has increased constantly during 1995–2008 (Figure 2, p. 22).

The use of hypnotics has also increased. The number of persons refunded for the costs of hypnotics has increased from 1995 to 1998, then decreased from 1998 to 2000, and then constantly increased (Figure 3, p. 22). The decrease during 1998–2000 was due to the fact that some hypnotics and sedatives were not included in the refund system (Finnish Statistics on Medicines 2009).

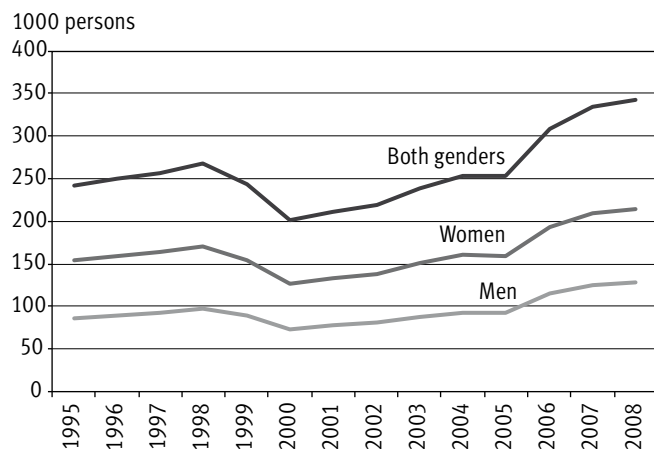
The number of people entitled to a refund for their medication is only a crude estimation of the medication use and a much cruder estimation of the sicknesses. Refunds of drugs prescribed by a doctor have covered only a part of the prescriptions, partly because there is a threshold price that some affordable medicines do not exceed and thereby get left out of the statistics. Many people suffering from a sickness do not use medicine or even go to visit a doctor.

Figure 2. Number of persons refunded for the costs of antidepressants (N06A) by the Social Insurance Institution in Finland 1995–2008.



Source: The Social Insurance Institution.

Figure 3. Number of persons refunded for the costs of hypnotics (N06A) by the Social Insurance Institute in Finland 1995–2008.



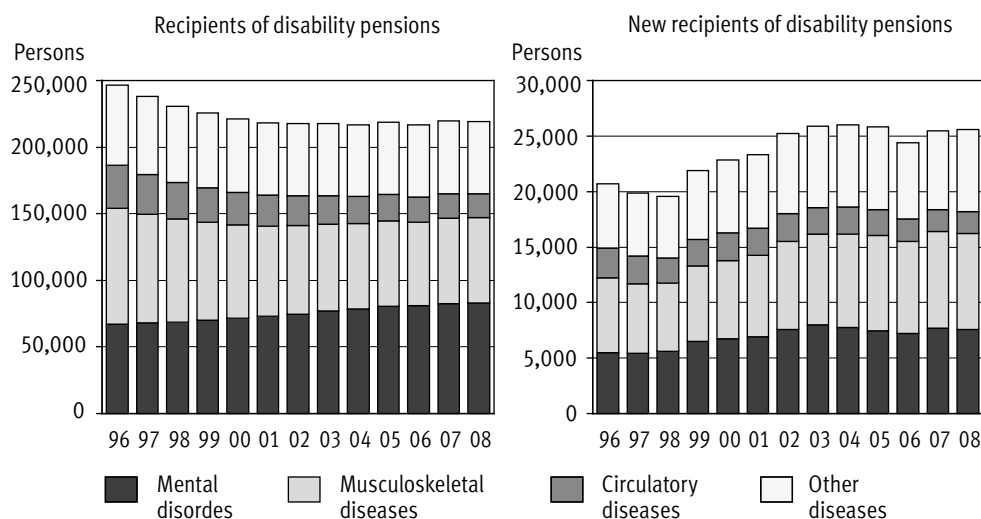
Source: The Social Insurance Institution.

1.5.2 Disability pensions

In Finland, approximately 80% of employees retire before the formal age of old age pension (OECD 2010). About 7% of the working age population of Finland was on disability pension in 2006, and about 44% of disability pensions were granted on the basis of mental health, especially on the basis of depressive disorders (Statistical Yearbook of Pensioners ... 2008). In European countries, work disability pensions, especially on the basis of mental health disorders, has increased during the past two

decades. According to many indicators, the health and functional capacity of Finns have increased significantly during the last decades (Gould et al. 2008), but the number of disability pensions has stayed at about the same level for two decades. The number of people on disability pension has decreased slightly from 1996 to 2004, but the number of persons granted a new disability pension has increased up to the year 2004 (Figure 4).

Figure 4. Recipients of disability pensions and persons having retired on a disability pension by main diagnosis in 1996–2008, statutory earnings-related pensions.



The numbers include ordinary disability pensions and individual early retirement pensions.

Source: The Finnish Centre for Pensions / H Nyman.

1.6 Social factors at work

1.6.1 The concept of social support

Social support has been defined as resources provided by other persons (Cohen and Syme 1985), or information leading the subject to believe that he or she is cared for and loved, and esteemed and valued (Cobb 1976). Social relationships have many aspects; first their existence and quantity, second their formal structure, and third their functional content. These aspects are termed social integration, social networks and relational content. The concept of social support is one type of relational content; the others are relational demands and conflicts, and social regulation or control (House et al. 1988a).

Social integration, social network structure, and the content of social relationships have been widely studied since the 1970s. Social integration means the existence or amount of social relationships. The integration might be described by the magnitude of the social network, belonging to different social organisations, and participating in

their activities. The integration has also been measured with the existence of different social bonds, for example the spouse or relatives (House et al. 1988a). Measurements of social networks include contacts, number of contacts, frequency of contacts, and density of networks. Measurements of social support include types of support (emotional, informational, self-appraisal, instrumental, practical), as well as negative interaction. The types of support may also be divided into only two categories, into emotional and practical support. Emotional support, in turn, includes informational support, which may help the respondent in problem-solving, and support related to self-appraisal, providing support that boosts self-esteem and encourages positive self-appraisal. Practical support includes, among other things, practical help and financial support. (Stansfeld 2006.)

In sum, social support is a multidimensional construct with different types or kinds of support (Table 3). The essential dimensions of social support are emotional, appraisal, informational, and instrumental and tangible support (Schaefer et al. 1981; House et al. 1988b). Emotional support (affect) includes the provision of caring, empathy, love, and trust. Emotional support is the most important category through which perception of support is conveyed. Appraisal support (affirmation) includes the communication

Table 3. Social support – a multidimensional construct.

Antecedents	Critical attributes Typology of four defining attributes	Consequences
<p>Social network</p> <ul style="list-style-type: none"> – A vehicle through which social support is provided – The structure of an interactive process; social support is the function <p>Social embeddedness</p> <ul style="list-style-type: none"> – The connectedness people have to significant others within a social network <p>Social climate</p> <ul style="list-style-type: none"> – The personality of an environment – Helpfulness and protectiveness are qualities of social climate that foster the defining attributes of social support 	<p>Emotional support (Affect)</p> <ul style="list-style-type: none"> – Provision of caring, empathy, love, and trust – Most important category through which perception of support is conveyed <p>Instrumental support (Aid)</p> <ul style="list-style-type: none"> – Provision of tangible goods, services or concrete assistance (aid) <p>Informational support</p> <ul style="list-style-type: none"> – Information provided to another during a time of stress – Informational support assists one to problem solve <p>Appraisal support (Affirmation)</p> <ul style="list-style-type: none"> – The communication of information which is relevant to self-evaluation rather than problem solving – Referred to as affirmational support made by another 	<p>Positive health status</p> <ul style="list-style-type: none"> – Personal competence – Health maintenance behaviours – Effective coping behaviours – Perceived control – Sense of stability – Recognition of self-worth – Positive affect – Psychological well-being – Decreased anxiety – Decreased depression

Source: Langford et al. 1997.

of information, which is relevant to self-evaluation rather than problem solving, and referred to as affirmational support given by another. Informational support includes information provided to another during a time of stress. Informational support assists one in problem-solving. Instrumental support (aid) includes the provision of tangible goods, services or concrete assistance (Langford et al. 1997). In some studies, social support has been defined as relational provisions, interpersonal transactions, or an individual perception about the adequacy or availability of different types of support (Kahn 1974; Nelson 1990). The sense of possibility to get support is like a personality feature, because the perceived possibility to get support has been noted to be quite stable (Sarason et al. 1990). The sense of social support is a part of the sense of acceptance, which relates to the harmonious structure of personality.

Mechanisms of social support in stress and health are usually classified into three major effects. The main effects suggest that there is a direct relationship between social support and outcomes, such as health or well-being. The moderating effects of social support involve the presence of a third variable, for example gender, that acts as an antecedent to affect the relationship of other variables, such as a stressor (independent variable), and an outcome (dependent variable). The mediating effects between social support and health act in such a way that variations of the influence (mediator), for example smoking, significantly account for variations in the main effect (Underwood 2000).

According to Callaghan and Morrissey (1993), social support affects health in three ways: by regulating thoughts, feelings and behaviour to promote health; by fostering an individual's sense of meaning in life; and by facilitating health-promoting behaviours. The mechanisms of social support in generating health are generally classified into three major effects: main, moderating, and mediating effects. The main effects of social support suggest that there is a direct relationship between social support and the outcomes, such as mental health.

Direct effects of social support on health may be mediated through health-related behaviours. Support may encourage healthier behaviours, such as giving up smoking, exercising, and reducing fat or sugar in the diet. The effects of social support on health may partially be mediated by social control (Cohen et al. 2000). Support may only be health-inducing if the sources of support practice healthy behaviours themselves. The direct effects of support on health may also result from support increasing perceptions of control over the environment, and giving an assurance of self-worth, which in turn may improve well-being and immunity to disease (Bisconti and Bergeman 1999). The buffering effects of social support may act in several ways. Discussion of a potential threat with a supportive person may help to reappraise the threat implicit in a stressor, perhaps thus making it more manageable or even avoiding it. Practical aid or emotional consolation may help to moderate the impact of the stressor and help the person deal with the consequences of the stressor, which might otherwise be damaging for health (Stansfeld 2006).

There is also evidence suggesting that the association between social support and health also works in the opposite direction. Poor health might be a barrier to maintaining or participating in social relationships (Ren et al. 1999). Social support may not only have a protective effect in preventing or decreasing the risk of the development of illness but may also be helpful for people who have to adjust to, or cope with, the stress of a chronic illness (Lindsay et al. 2001).

According to Johnson's model (1989), there are four different possibilities of how social relations affect health: 1) Social relations are a response to the basic human compulsions to be a group member. 2) Social relations are resources needed to cope with the demands of a job. 3) Social relations are interacting in adult socialising to promote either active or passive behaviour. 4) Social relations constitute a management system, with job control protecting employees from structural job demands and pressure.

Researches have tried to solve the question whether the influence of support on health depends on the buffering of stress, or on the direct influence on health regardless of stress. Several stress theories suggest that the effect of social support on health is interactive with stress and job characteristics (Karasek and Theorell 1990; Vahtera et al. 1996; Olstad et al. 2001). According to the stress-buffer hypothesis, social support protects employees from the pathological consequences in stress situations (Cohen and Wills 1985). Stress has been measured by the amount of negative life events, long-lasting stress or stress perceived at work. The measures of social support assessed the content of social relationships or structure, either at a specific or common level. It has also been noticed that imposed support may elicit negative reactions (Deelstra et al. 2003).

Some studies suggest that men profit more from daily emotional support than women do (e.g. Plaisier et al. 2007). There may also be interaction between genders in reciprocity of support and health. For women, it seems to be a risk for their health not being able, in intimate relationships, to give more support than to receive it, but the same effect does not apply to men (Väänänen 2005). There are also findings supporting that men seem to be affected adversely by poor support from their co-workers, whereas women seem to be affected more by poor supervisor support (Väänänen et al. 2003). Reciprocity may have implications for the maintenance of good social relations (Vahtera 1993).

1.6.2 Measuring social support

Among the various measures of social support, the most commonly used are those of perceived support. In general, these measures show quite a strong and consistent association with mental health, and also with many indices of physical health (Uchino 2004). Among the most common measures of perceived support are the Interpersonal Support Evaluation List (Cohen et al. 1985), and the Social Provisions Scale (Cutrona and Russell 1987). The first has two versions, and provides four subscales. The second provides six subscales. There is a wide range of other measures of perceived

support (Wills and Shinar 2000). The inventory of Socially Supportive Behaviors is the most common measure of enacted support (Barrera et al. 1981). The Social Network Index is a prototypical measure of social integration (Cohen et al. 1997). Other types of social support measures are behavioural observation, diary measures, and measures of social conflict. One observational assessment is the Social Support Behavior Code (Cutrona et al. 1997). Work-related studies have usually used instruments that measure also many other aspects of work, e.g. demands and control. The Job Content Questionnaire (JCQ) is one of the most commonly used tools (Stansfeld 2006). Other commonly used measures of social support at work are the Finnish Job Exposure Matrix (FINJEM), the Generic Job Stress Questionnaire (GJSQ), and the Occupational Stress Indicator (OS12).

1.6.3 Research on social support and the health of employees

Common social support has been studied extensively, even in hundreds of reviews. Social support measures have ranged from ‘the high love and support from a spouse’ to ‘the social network index’. Studies focusing on the association of social relationships with health and well-being have been increasing since the end of the 1970s. In 1976, Cassel published a study about the psychosocial factors influencing the immunologic and neuroendochrinic system by increasing or decreasing susceptibility to different causes of diseases. He supposed that integration to the immediate social community is one essential factor influencing vulnerability. He found that displacement, insularity, or the breakdown of social bonds related to the unspecific risk of disease. He suggested that the disadvantageous influence on a person from the breakdown of social bonds might be caused either by the loss of the feedback regulating behaviour, or the loss of social support. According to Cassel, the best way to improve the health of the population is to strengthen social support. (Cassel 1976.)

Kaplan and his co-workers (1988) examined the significance of social support in illnesses, and the potentiality to promote health by utilising social support. They differentiated the functional quality corresponding to internal compulsion from the structural characteristic of social support, of the morphology of the social network.

At the same time, Cobb (1976) defined social support as information leading the subject to believe that he/she is cared for and loved, esteemed, and a member of a network of mutual obligations. He reviewed supportive interactions among people as protection against the health consequences of life stress. According to Cobb, the accumulation of life events increased disadvantages among people with low social support, but not among people with high social support.

The evaluation of the protection hypothesis was active in the 1980s. In a cohort with a baseline clinical health examination, House and his co-workers examined mortality (House et al. 1982). After adjustments for age and a variety of risk factors for mortality, men reporting higher levels of social relationships and activities at the baseline were

significantly less likely to die during the follow-up period. Trends for women were similar, but generally non-significant after adjustment of age and other risk factors.

Blazer (1982) examined the adequacy of social support with three parameters: roles and available attachments, perceived social support, and the frequency of social interaction. These three parameters of social support significantly predicted mortality in both crude and controlled analyses in a community sample. Many studies in the 1980s and 1990s have supported these findings in the association between social support and mortality, especially among men (Orth-Gomer and Johnson 1987; House et al. 1988b; Kaplan et al. 1988; Hanson et al. 1989; Jylhä and Aro 1989; Olsen et al. 1991; Järvikoski et al. 2001). Mortality studies suggested that lack of social support has at least as strong of an influence on mortality as the well-known focal risk factors, such as smoking, overweight, and dyslipidemia.

The association of social support with various somatic diseases has been studied in several studies. In a review of 21 prognostic studies of social support, 10 were strongly supportive of an inverse association between social support and coronary heart disease (Kuper et al. 2002). A review of the course and progression of cancer identified evidence of a relationship between low social support and cancer progression among patients from 6 studies, and 9 studies that found little or no association (Garssen 2004). In a review of 67 studies of low social support and physical, psychological, and stress-related ill health, associations were usually positive, but small in magnitude, and the overall findings were inconclusive (Smith et al. 1994). A meta-analysis of support from a spouse and mortality concluded that marriage was associated with lower mortality (Manzoli et al. 2007). In a systematic review of over a hundred studies, low social support was associated with neck pain in employees (Cote et al. 2008). A systematic review and meta-analysis showed some evidence for an impact of low functional social support on the prevalence of coronary heart disease, but no evidence of an impact of low structural social support on the prevalence of myocardial infarction in healthy populations (Barth et al. 2010). In a Norwegian longitudinal study among working population, lack of social support in private life had a weak association with low back pain (Brage et al. 2007). In a Finnish study, social support was not associated with early atherosclerosis in young employees (Hintsanen et al. 2005). In an English longitudinal survey among school teachers, high stress was associated with increased systolic blood pressure, diastolic blood pressure, and heart rate, but the impact of stress was buffered by social support (Stephoe 2000).

Less research has been published on the association between social support and diagnosed mental disorders and sleep disturbances. In a 2-year longitudinal survey among approximately 2,600 people from the Dutch general population, more daily emotional support was associated with lower risks of depressive and anxiety disorders (Plaisier et al. 2007). The lack of emotional support was associated with poorer sleep, especially among women in a cross-sectional Swedish survey among over 1,000 employees (Nordin et al. 2005). In a Japanese cross-sectional survey among 1,634 male

employees at general enterprises, the higher the social support was, the better was mental health (Fujita and Kanaoka 2003).

1.6.4 Research on social support at work and the health of employees

Social support at work and the mental health of employees have been studied less extensively. In the longitudinal, prospective Whitehall II Study, among over 10,000 London-based civil servants, low social support at work was associated with the increased risk of psychological distress as assessed by the GHQ (General Health Questionnaire) score (Goldberg 1972; Stansfeld et al. 1999). In a 5-year longitudinal survey among French electricity and gas company employees, low level of social support at work was a significant predictor of subsequent depressive symptoms in both men and women. The results were unchanged after adjustment for potential confounding variables (Niedhammer et al. 1998). In a longitudinal study, high social support at work has also been found to be related to lower risk of short spells of psychiatric sickness absence (Stansfeld et al. 1997).

In the 2000s, considerable numbers of work related social support studies were published. A summary of the research on social support at work and health in the 2000s is presented in Table 4 (pp. 30–34). Most studies have shown at least some evidence of the impact of social support at work on health. Low social support at work has been related, for example, to cardiovascular diseases (De Bacquer et al. 2005; Andre-Petersson et al. 2007), risk for increase in blood pressure and heart rate (Steptoe 2000; Evans and Steptoe 2001; Guimont et al. 2006), mental disorders and psychological distress (Bultmann et al. 2002; Paterniti et al. 2002; Escriba-Aguir and Tenias-Burillo 2004; Godin and Kittel 2004; Watanabe et al. 2004; Bourbonnais et al. 2006; Rugulies et al. 2006; Shields 2006; Blackmore et al. 2007; Stansfeld et al. 2008; Virtanen et al. 2008; Waldenström et al. 2008; Ikeda et al. 2009; Malinauskiene et al. 2009; Lopes et al. 2010), insomnia, fatigue or burnout (Nakata et al. 2001; Åkerstedt et al. 2002; van der Ploeg and Kleber 2003; Nakata et al. 2004), poor perceived health (Park et al. 2004; Väänänen et al. 2004; Kopp et al. 2008; Cohidon et al. 2009), adverse serum lipids (Bernin et al. 2001), lower back problems (Eriksen et al. 2004a; IJzelenberg and Burdorf 2005; van Vuuren et al. 2006), neck pain (Ariens et al. 2001), sickness absences (Väänänen et al. 2003), and health effects via alteration of immunity (Miyazaki et al. 2005).

Table 4. Review of literature on social support at work and health in the 2000s.

Authors and date	Country	Study design (response rate)	Sample	n	Social support measure	Main results
Inoue et al. 2010	Japan	Longitudinal, mean follow-up 5.1 years (85%)	Male employees in six factories	15256	Social support from supervisors and co-workers (NIOSH-GJSQ)	Support from supervisors or co-workers was not associated with sick leave risk due to depressive disorders.
Lopes et al. 2010	Brazil	Cross-sectional survey (84%)	Non-faculty civil servants working at university campuses	3574	Social support from supervisors and co-workers (JCQ)	Low social support at work was associated with psychological distress (the association was stronger in men).
Malinauskienė et al. 2009	Lithuania	Cross-sectional survey (58%)	Kaunas district community nurses	372	Social support at work (JCQ)	Low social support at work was a risk factor for mental distress.
Cohidon et al. 2009	France	Cross-sectional survey (50%)	Employees of the meat industry	2983	Social support at work (JCQ)	Low social support at work was associated with poor perceived health.
Ikeda et al. 2009	Japan	Cross-sectional survey (89%)	Workers in small- and medium-scale manufacturing enterprises	2303	Support from supervisor, colleagues, and family (GJSQ)	Low social support at work was associated with depressive symptoms (CES-D) among women.
Stansfeld et al. 2008	United Kingdom	Cross-sectional and longitudinal survey (72%)	The 1958 Birth Cohort	8243	Social support at work (JCQ)	Low social support at work was associated with psychological distress.
Virtanen et al. 2008	Finland	Cross-sectional survey (83%)	Finnish population	3374	Social support at work (JCQ) and in private life (Sarason)	Lack of social support at work was associated with depression and anxiety (CID), and among women, also a lack of private support.
Waldenström et al. 2008	Sweden	Selection according to low or high well-being (84%)	Employed men and women in different occupations	672	Social support at work (JCQ)	Lack of instrumental support at work was associated with an increased risk for depression (Interview).
Kopp et al. 2008	Hungary	Cross-sectional survey (82%)	Hungarian economically active population	5863	Social support from co-workers and satisfaction with the boss	High social support from co-workers was associated with good self-rated health in men and satisfaction with the boss with good self-rated health in women.

Authors and date	Country	Study design (response rate)	Sample	n	Social support measure	Main results
Blackmore et al. 2007	Canada	Cross-sectional survey (77%)	Canadian population	24324	Social support at work (JCQ)	Lack of social support at work was associated with depression (CID). Low social support at work was a predictor of myocardial infarction and stroke among women, but not among men.
Andre-Petersson et al. 2007	Sweden	Longitudinal, mean follow-up about 8 years	Individuals born 1923-45 and living in Malmö	7770	Social support at work and outside of work (MDCSQ)	High social support at work was not associated with a reduced risk for coronary heart disease.
Aboa-Eboule et al. 2007	Canada	9-year prospective cohort study	Patients with first acute myocardial infarction from 30 hospitals	1191	Social support at work (WIRI)	Low social support was not significantly associated with depression symptoms.
Clays et al. 2007	Belgium	Longitudinal, mean follow-up 6.6 years (67%)	Workers from nine companies or public administrations	2821	Social support at work (JCQ)	Low social support was associated with psychological distress (PSI).
Bourbonnais et al. 2006	Canada	2-year intervention survey (73%)	Care providers in an acute care hospital	492	Social support at work (JCQ)	Greater commitment to the work organization was related to better work ability among both genders. Commitment to the work organisation and co-workers' support were associated with a reduced risk of impaired mental work ability among the women.
Taskila et al. 2006	Finland	Case referent cross-sectional survey (83%)	Employed people with cancer and their referents	1348	Social support at work (QPSNordic)	Low supervisor support increased the risk for severe depressive symptoms among women.
Rugulies et al. 2006	Denmark	5-year longitudinal survey (80%)	Representative sample of the Danish work force	4133	Social support from supervisor and co-workers	Support from immediate superior was not related to fatigue.
Eriksen 2006	Norway	15-month prospective study (62%)	Nurses' aides	4645	Social support from supervisor (QPSNordic)	Low support, both from supervisor and co-workers, was associated with higher odds of depression among both genders.
Shields 2006	Canada	2-year longitudinal survey (81%)	Canadian population	12011	Social support from supervisor and co-workers (JCQ)	Low social support was slightly associated with lower back pain.
van Vuuren et al. 2006	South Africa	Cross-sectional survey (96%)	Manganese plant workers	109	Social support at work and in private life (APGAR)	

Table 4 continues.

Authors and date	Country	Study design (response rate)	Sample	n	Social support measure	Main results
Guimont et al. 2006	Canada	12-year longitudinal survey (54%)	White-collar workers in one city	6719	Social support at work (JCQ)	Job strain increased blood pressure more significantly among employees with low social support at work.
Miyazaki et al. 2005	Japan	Two cross-sectional surveys	Electric equipment manufacturing male workers	383	Social support at work and in private life	Social support at work and in private life was associated with the immune system function.
Radi et al. 2005	France	Case control study	Hypertensive patients from 20 physicians and controls	609	Social support at work (JCQ)	Low social support at work was not related to hypertension.
Ijzelenberg and Burdorf 2005	Netherlands	6-month longitudinal survey (81%)	Industrial workers from 9 companies	407	Social support from supervisor and co-workers (a numerical rating scale ranging from 0 to 10)	Low social support at work was associated with increased risk for lower back pain.
DeBacquer et al. 2005	Belgium	3-year longitudinal survey (48%)	Middle-aged working men	14337	Social support at work (JCQ)	Low social support at work was associated with subsequent coronary events among men.
Watanabe et al. 2004	Japan	Cross-sectional survey (86%)	Male workers in a corporation	340	Social support at work and in private life (GJSQ)	Low social support was associated with depressive state.
Seidler et al. 2004	German	Cross-sectional case-control survey (77%)	Patients with dementia and their controls	424	Social support from the supervisor (FINJEM)	Social support from the supervisor was not related to dementia.
Väänänen et al. 2004	Finland	4-year longitudinal survey (63%)	Employees in a Finnish company	2225	Organizational, supervisor's, and co-workers' support	Negative changes experienced in one's job position, and lack of upper-level social support at work created a potential risk for health impairment in different employee groups in merging enterprises.
Escriba-Aguir and Tenias-Burillo 2004	Spain	Cross-sectional survey (77%)	Hospital personnel	313	Social support at work (SF-36)	Low social support at work was associated with bad mental health, low vitality, and limitation in social function.
Godin and Kittel 2004	Belgium	1-year longitudinal survey (40%)	Employees from 4 companies	3804	Social support at work (JCQ)	Low social support at work was associated with depression, anxiety, somatisation, and chronic fatigue.

Authors and date	Country	Study design (response rate)	Sample	n	Social support measure	Main results
Eriksen et al. 2004b	Norway	3-month prospective study (62%)	Nurses' aides	4931	Social support from supervisor (QPSNordic)	Perceived support from immediate superior was not associated with an increased risk of sickness absences due to airway infections.
Eriksen et al. 2004a	Norway	3-month prospective study (62%)	Nurses' aides	3651	Social support from supervisor (QPSNordic)	Reduced perceived support at work was related to sick leaves over 14 days due to lower back pain.
Nakata et al. 2004	Japan	Cross-sectional survey (92%)	Male white-collar employees	1161	Social support at work and in private life (GJSQ)	Low co-workers' support was associated with an increased risk for insomnia.
Park et al. 2004	United States of America	Cross-sectional (31%)	Hospital workers	240	Supervisor and co-worker support (Heaney's scale)	Social support at work had a direct and beneficial effect on workers' psychological well-being and organizational productivity.
Andrea et al. 2003	Netherlands	Cross-sectional survey	Employees from 45 different companies and organisations	7482	Social support from supervisor and co-workers (JCQ)	Social support at work was not associated with fatigue.
Väänänen et al. 2003	Finland	1-year 9-month longitudinal survey (43%)	Private industrial employees	3895	Social support from supervisor and co-workers	Lack of co-workers' support increased sickness absences among men and lack of supervisor support among women.
van der Ploeg and Kleber 2003	Netherlands	1-year longitudinal survey (31%)	Ambulance workers	123	Social support from supervisor and co-workers (QEAM)	Lack of social support from the supervisor and co-workers were related with fatigue and burnout.
Michelsen and Bildt 2003	Sweden	24-year longitudinal survey (60%)	Employed people aged 42-58 years	367	Social support from supervisors	Lack of social support from supervisors was associated with impaired psychological well-being among men.
Åkerstedt et al. 2002	Sweden	Cross-sectional survey	Employees living in the Stockholm area	5231	Social support at work	Low social support at work was related to disturbed sleep.
Bultmann et al. 2002	Netherlands	1-year longitudinal (45%)	Employees from 45 companies and organizations	12095	Social support at work (JCQ)	Low social support from supervisor and from co-workers predicted psychological distress among men.

Table 4 continues.

Authors and date	Country	Study design (response rate)	Sample	n	Social support measure	Main results
Patemiti et al. 2002	France	3-year longitudinal survey (79%)	Electricity and gas company workers	10519	Social support at work	Low social support at work was predictive of worsening depressive symptom.
Evans and Steptoe 2001	England	5-day self-monitoring survey	Nurses and accountants	93	Social support at work	Low social support at work was associated with elevated heart rate.
Bernin et al. 2001	Sweden	Cross-sectional survey (36%)	Male managers	58	Social support at work and in private life (OS12)	Good social support at work and in private life was consistently associated with low adverse serum lipids and corresponding lipoproteins.
Ariens et al. 2001	Netherlands	3-year longitudinal survey (73%)	Industrial and service workers	1334	Social support at work (JCQ)	Low co-workers' support was related to neck pain.
Nakata et al. 2001	Japan	Cross-sectional survey	Shift workers in an electrical equipment manufacturing company	530	Social support at work (JCQ)	Lower social support at work was significantly associated with a greater risk of insomnia than the higher social support.

APGAR=Adaptation, Partnership, Growth, Affection, and Resolve Questionnaire
 CES-D=Center for Epidemiologic Studies Depressive Symptoms Scale
 CIDJ=Composite International Diagnostic Interview
 FINJEM= Finnish job exposure matrix
 GJSQ= Generic Job Stress Questionnaire
 ISEL=the Interpersonal Support Evaluation List
 ISSI=Interview Schedule for Social Interaction
 JCQ=Job Content Questionnaire
 MDCSQ=Malmö Diet and Cancer Study Questionnaire
 NIOSH-GJSQ= National Institute for Occupational Safety and Health Generic Job Stress Questionnaire
 OS12=Occupational Stress Indicator
 PSI=Psychiatric Symptom Index
 QEAW=Questionnaire on the Experience and Assessment of Work
 QPSNordic=General Nordic Questionnaire for Psychological and Social Factors at Work
 SF-36= SF-36 Health Survey
 SSQS=Social Support Questionnaire for Satisfaction
 SSQT=Social Support Questionnaire for Transactions
 WIRI=Work Interpersonal Relationship Inventory

However, there are also many studies showing no evidence of an association between social support at work and the health of employees. A longitudinal study among over 15,000 male employees in six factories did not find any association between support from the supervisor or co-workers and sick leave risk due to depressive disorders (Inoue et al. 2010). In a 9-year prospective cohort study among employees with first acute myocardial infarction from 30 hospitals, high social support at work was not associated with reduced risk for a later coronary heart disease event (Aboa-Eboule et al. 2007). Low social support at work was not associated with hypertension in a case control study in France (Radi et al. 2005). In a longitudinal survey in Belgium among workers from nine companies or public administrations, low social support was not significantly related to depressive symptoms (Clays et al. 2007). Support at work was not related to fatigue among over 7,000 employees in the Netherlands (Andrea et al. 2003), nor was support from the immediate superior related to fatigue among over 4,600 nurses' aides in a 15-month prospective study in Norway (Eriksen 2006). In a longitudinal Swedish survey, lack of social support from the supervisor was associated with impaired psychological well-being among men, but the association failed to reach significance with further adjustment (Michelsen and Bildt 2003). Perceived support from the immediate superior was not associated with an increased risk of sickness absences due to airway infections (Eriksen et al. 2004b).

In a cross-sectional study in the Stockholm district, the lack of social support at work was found to be associated with disturbed sleep (Åkerstedt et al. 2002). In another cross-sectional study, the BELSTRESS Study, low social support at work was associated with higher levels of tiredness, sleeping problems, and the use of psychoactive drugs (Pelfrene et al. 2002). A Swedish case-referent study showed low social support in private life to associate with poorer sleep among women, but not among men (Nordin et al. 2005). A cross-sectional study among male white-collar employees showed an association between low social support from co-workers and insomnia, but no association between low support from a supervisor or from family and friends and insomnia (Nakata et al. 2004). The association between co-worker support and insomnia failed to reach significance when adjusted for confounding factors. A prospective study among 100 postal workers showed low social support to have a negative impact on sleep quality (Wahlstedt and Edling 1997).

Studies about the association between psychosocial factors at work and prescription drugs are scarce (Virtanen et al. 2007; Kouvonen et al. 2008). Although there exist studies about social support and antidepressants, studies investigating the association between support at work and antidepressant use are scarce. The association between social support at work and the use of hypnotics and sedatives has not been studied very much, and neither has the association between team climate and antidepressants.

To date, only few studies have focused on the association between social support and disability pension. A weak association has been found between low general social support and risk of disability pension in a prospective Danish study (Labriola and Lund 2007). A weak association between low private life support and disability because

of lower back disorders was found in a population-based prospective study among occupationally active persons (Brage et al. 2007). In a prospective study among approximately 1,000 Finnish men, supervisor support was not significantly related to disability retirement, nor was support from co-workers (Krause et al. 1997). Women with low general social support had a higher risk of disability pension in a Danish study estimating gender differences and factors in- and outside work in relation to retirement rates (Albertsen et al. 2007).

Many studies have been cross-sectional, but there exist also longitudinal studies, some of them even with over ten years of follow-up (Michelsen and Bildt 2003; Guimont et al. 2006). Cross-sectional studies suffer from problems of causality direction. Longitudinal studies have often had only one measure of social support at the baseline, and then the outcome measure at the end of the study, often after many years. It is not always clear if the social support stage has stayed unchanged during the follow-up period. There have also been case control and intervention surveys (Radi et al. 2005; Bourbonnais et al. 2006). Social support studies have been done in many countries on every continent, but most of them in Europe and North America. Studies have been done among different occupations but some of them have also been population-based (Rugulies et al. 2006; Shields 2006; Blackmore et al. 2007; Kopp et al. 2008). Many surveys have only been done among men and many among occupations dominated by women, for example hospital personnel. Some studies have consisted of under one hundred participants (Bernin et al. 2001; Evans and Steptoe 2001), and some over 15,000 (Blackmore et al. 2007; Inoue et al. 2010). Some surveys have had a very low participation rate, less than 40% even (Bernin et al. 2001; van der Ploeg and Kleber 2003; Park et al. 2004), while in others it has exceeded 80% (Nakata et al. 2004; Watanabe et al. 2004; IJzelenberg and Burdorf 2005; Shields 2006; van Vuuren et al. 2006; Kopp et al. 2008; Ikeda et al. 2009; Inoue et al. 2010; Lopes et al. 2010).

Many studies concerning social support have dealt with several psychosocial factors at work associated with welfare. Some studies have used a numerical scale ranging from 0 (no support) to 10 (high support) (IJzelenberg and Burdorf 2005), or measured only common support at work (Escriba-Aguir and Tenias-Burillo 2004). Some studies have measured the different parts of support and then made a common support scale. Among social support at work there has also been organisational support (Väänänen et al. 2004). Some Norwegian studies have measured only support from the supervisor using the General Nordic Questionnaire for Psychological and Social Factors at Work (QPSNordic) and some studies have measured social support from co-workers and satisfaction with the supervisor (Kopp et al. 2008). There are some studies, although few in number, in which support has been researched both at work and in private life (Bernin et al. 2001; Nakata et al. 2004; Watanabe et al. 2004; Miyazaki et al. 2005; van Vuuren et al. 2006; Andre-Petersson et al. 2007; Ikeda et al. 2009). A social support measure in common use is the Job Content Questionnaire (JCQ) by R. Karasek. JCQ is a measure for job strain (Karasek et al. 1998). Many scales have modifications used in different countries.

As mentioned earlier, some studies have researched only men or occupations dominated by women, but studies done among both genders have found some differences between the sexes related to social support effects. In a cross-sectional Brazilian survey among over 3,500 non-faculty civil servants working at university campuses, the association between low social support at work and psychological distress was stronger in men than in women (Lopes et al. 2010). In a Japanese cross-sectional study among workers in small- and medium-scale manufacturing enterprises, low social support at work was associated with depressive symptoms only among women (Ikeda et al. 2009). In a Swedish longitudinal survey with a follow-up time of about 8 years, low social support at work was a predictor of myocardial infarction and stroke only among women, but not among men (Andre-Petersson et al. 2007).

The source of support has been found to have different effects, sometimes observable only in one gender or among employees at different occupational grades. In a Finnish longitudinal survey among over 2,000 employees, weak organisational support was associated with impaired subjective health in blue-collar workers, and weak supervisor support with impaired functional capacity in white-collar workers, while strong co-worker support increased the risk of poor subjective health among blue-collar workers when their job status declined (Väänänen et al. 2004). In a Hungarian cross-sectional study among almost 6,000 economically active individuals, high social support from co-workers was associated with good self-rated health in men and satisfaction with the boss with good self-rated health in women (Kopp et al. 2008). Low supervisor support increased the risk for severe depressive symptoms only in women in a 5-year longitudinal survey among the Danish work force (Rugulies et al. 2006). In a 2-year longitudinal study among over 12,000 Canadians, low support from co-workers was associated with higher odds of depression in both genders (Shields 2006). Among male white-collar Japanese employees, low social support only from co-workers was associated with an increased risk for insomnia (Nakata et al. 2004). In a Finnish longitudinal survey among private industrial employees, the lack of co-worker support increased sickness absences in men and the lack of supervisor support among women (Väänänen et al. 2003). Low support only from co-workers was related to neck pain in a 3-year longitudinal survey among industrial and service workers in the Netherlands (Ariens et al. 2001).

1.6.5 The concept of work team climate

There is growing evidence in the research literature that organisational culture and climate play central roles in the social context of an organisation (Hemmelgarn et al. 2006). Climate is by far the older of the two constructs in the organisational literature. It was first mentioned in the 1950s, and gained its popularity in the 1960s. Culture, in turn, was introduced in the organisational literature in the 1970s and gained popularity in the 1980s. However, when culture and climate were first discussed together in the 1990s, a great deal of confusion was generated about their differences and similarities (Glisson 2007).

Organisational culture captures the way things are done in an organisation, and climate captures the way people perceive their immediate work environment. Therefore, culture is a property of the organisation, while climate puts individuals at centre stage. While culture reflects behaviours, norms, and expectations, climate reflects employees' perceptions of and emotional responses to the characteristics of the work environment (Glisson and James 2002). Several factors related to the climate at work might also increase occupational health risks. Of the stress theories, the work stress model (Cooper 1998) states that a lack of clarity regarding the employees' responsibilities at work contributes to role conflict and ambiguity. Individuals subjected to the organisational conditions of role ambiguity tend to be low in self-confidence and job satisfaction, and high in tension and sense of futility, while interventions which clarify expectations and goals may decrease stress and improve health (Semmer 2003).

Common goals, clear duties, responsibilities, rules and ways of action among employees are features characteristic of work communities with a good team climate. A community with a good climate is dynamic and quick to learn, cooperation is fluent, and there is also time for social interaction. Confidence in the future and trust in the ability to solve problems lay the foundation for a good team climate. External threats and uncertainty contribute negatively to the team climate. Employees working in organisations with a good climate are more likely to be satisfied with their jobs, and more committed to their organisations. (Glisson and James 2002.) Team climate has influence on the amount of sickness absences, service quality, employees' morale, turnover of personnel, implementation of innovations, and team efficiency (Glisson 2007).

1.6.6 Measuring work team climate

There are many different scales for measuring team climate. The Job Exposure Matrix (JEM) constructed by Kauppinen and colleagues (the so-called "FINJEM") was constructed to include the most relevant physical, chemical, microbiological, ergonomic, and psychosocial exposures or stress factors. The social climate at work was assessed based on questions concerning the degree of open communication, information flow, and cooperation (Kauppinen et al. 1998). Some inventories measure work group cohesion or psychological and social factors at work or occupational stress. Commonly used measures of team climate are e.g. the Occupational Stress Questionnaire (OSQ), the Areas of Worklife Scale (AWS), the Healthy Organization Questionnaire of the Finnish Institute of Occupational Health (Lindström et al. 1997), and the Team Climate Inventory (TCI) (Anderson and West 1996).

1.6.7 Research on work team climate and the health of employees

In the context of health, work team climate has not been as extensively studied as social support. A summary of the studies on team climate and health in the 2000s is presented in Table 5. The earlier results of the mostly cross-sectional studies have

Table 5. Review of literature on team climate and health in the 2000s.

Authors and date	Country	Study design (response rate)	Sample	n	Team climate measure	Main results
Lasalvia et al. 2009	Italy	Cross-sectional (79%)	Mental health staff	2017	Work group cohesion (AWS)	Weak work group cohesion was associated with burnout in staff.
Taskila et al. 2006	Finland	Case referent cross-sectional survey (83%)	Employed people with cancer and their referents	1348	Social climate (QPSNordic)	A better social climate at work was related to better common and mental work ability among both genders.
Eriksen 2006	Norway	15-month prospective study (62%)	Nurses' aides	4645	Psychological and social factors at work (QPSNordic)	Social climate in the work unit was not associated with fatigue.
Ylipaavalniemi et al. 2005	Finland	2-year longitudinal survey (74%)	Hospital personnel	4815	Team climate (TCI)	Poor team climate was predictive of subsequent depression.
Eriksen et al. 2004b	Norway	3-month prospective study (62%)	Nurses' aides	4931	Psychological and social factors at work (QPSNordic)	Perceived lack of an encouraging and supportive culture in the work unit was associated with an increased risk of sickness absences due to airway infections.
Seidler et al. 2004	German	Cross-sectional case-control survey (77%)	Patients with dementia and their controls	424	Social climate at work (FIN-JEM)	Social climate at work was not related to dementia.
Eriksen et al. 2004a	Norway	3-month prospective study (62%)	Nurses' aides	3651	Psychological and social factors at work (QPSNordic)	Supportive and encouraging culture was associated with lower odds of sickness absences due lower back pain.
Väänänen et al. 2004	Finland	3-year longitudinal survey (56%)	Employees of a forest industry corporation	3850	Occupational stress (OSQ)	In blue-collar women, poor climate was associated with a greater rate of short absence spells.
Eriksen et al. 2003	Norway	3-month prospective study (62%)	Nurses' aides	4931	Psychological and social factors at work (QPSNordic)	Perceived lack of encouraging and supportive culture in the work unit was the most important factor predicting sickness absence.
Piirainen et al. 2003	Finland	Two cross-sectional surveys (71% and 58%)	Population-based	3584	Occupational stress (OSQ)	A tense and prejudiced climate was associated with psychological and also musculoskeletal symptoms.

Table 5 continues.

Authors and date	Country	Study design (response rate)	Sample	n	Team climate measure	Main results
Kivimäki et al. 2001	Finland	2-year longitudinal survey (55% and 89%)	Hospital physicians, controls female head nurses and ward sisters	447 and 466	Team climate (TCI)	Of the work related factors, poor teamwork had the greatest effect on sickness absence in physicians but not in the controls.

AWS = The Areas of Worklife Scale

FINJEM = Finnish Job Exposure Matrix

OSQ = Occupational Stress Questionnaire

QPSNordic = General Nordic Questionnaire for Psychological and Social Factors at Work

TCI = Team Climate Inventory

been ambiguous. In one cross-sectional study, good climate was related to a lower probability of mental distress (Revicki and May 1989), and in an Italian cross-sectional survey among mental health staff, weak work group cohesion was associated with burnout (Lasalvia et al. 2009). In a Finnish study of more than 1,700 employees from health care organisations and from enterprises in the metal and retail industries, poor team climate was found to have an association with high stress (Länsisalmi and Kivimäki 1999). In a 2-year longitudinal Finnish survey of work-related factors, poor teamwork had the greatest effect on sickness absence in physicians (Kivimäki et al. 2001). In another Finnish longitudinal survey among employees from a forest industry corporation, poor climate was associated with a greater rate of short absence spells in blue-collar women (Väänänen et al. 2004). An increased risk for sickness absences due to airway infections (Eriksen et al. 2004b), and due to low back pain (Eriksen et al. 2004a), was found in two longitudinal Norwegian surveys among nurses' aides. The perceived lack of an encouraging and supportive culture in the work unit was the most important factor predicting sickness absence in an earlier Norwegian study (Eriksen et al. 2003). In a case-referent cross-sectional study among employees with cancer, a better social climate at work was related to better overall and mental work ability among both genders (Taskila et al. 2006). In a 2-year longitudinal survey among hospital personnel, poor team climate was predictive of subsequent self-reported doctor-diagnosed depression (Ylipaavalniemi et al. 2005). In a Finnish population-based study (Piirainen et al. 2003) a tense and prejudiced work climate was found to be associated with psychological and musculoskeletal symptoms and sick-leave days when compared with a relaxed and supportive climate.

Some studies have not shown any relation between team climate and health impairment. In a German study among patients with dementia and their controls, earlier social climate at work was not related to dementia (Seidler et al. 2004). Another study failed to find an association between social climate in the work unit and fatigue (Eriksen 2006).

1.7 Gaps in previous research

Despite the extensive research on the relationship between social relations and health, several gaps in previous investigations can be identified. Many studies have relied on the self-estimation of depressive, anxiety, and alcohol use symptoms, and only very few have employed diagnosis-based measures (Blackmore et al. 2007; Virtanen et al. 2008; Waldenström et al. 2008). In addition, population-based studies are scarce (Shields 2006; Blackmore et al. 2007; Kopp et al. 2008). Most studies have had selected samples and thus it is not clear to what extent the existing evidence can be extrapolated to the general population. Societal aspects (i.e. disability pensions and use of antidepressants and hypnotic drugs) have been studied very little (Krause et al. 1997; Albertsen et al. 2007; Inoue et al. 2010). In many studies on disability pensions, the samples used have been small or have also included the unemployed or those outside working life already at baseline. Studies concerning the association between social relations at work and medication or disability pensions are scarce. Specific scales for work-related social support have rarely been used, and only few studies have compared work and non-work support (Nakata et al. 2004; van Vuuren et al. 2006; Andre-Petersson et al. 2007; Ikeda et al. 2009). Team climate associated with health of employees has not been investigated much, and studies assessing the association between team climate and mental disorders are scarce (Ylipaavalniemi et al. 2005). The study by Ylipaavalniemi and co-workers was not population-based and did not rely on a diagnosis-based psychiatric interview. More studies are also needed about gender differences in the associations between social relations at work and in private life and health.

In the present study, using the population-based data of the nationwide Health 2000 Study, mental health was examined in a cohort of employees with a standardised psychiatric interview (CIDI). Recorded purchases of prescribed antidepressants and hypnotics and sedatives were followed. Disability pensions were drawn from the national register covering all disability pensions in Finland, and thus no individuals were lost in the follow-up. Social support both at work and in private life, as well as team climate, were assessed with self-assessment scales.

2 PRESENT STUDY

2.1 Framework of the study

This study was conducted in the framework of occupational and public health and medicine with the aim to investigate two social factors at work, namely social support and team climate, associated with the health of employees but also causing cost to society.

Working ability is thought to be composed of many factors, among them the employee's health and competence, the work environment, and the work community. Ill-health is defined as a discrepancy between the individual and the environment (Tinsley 2000). Work-related and social aspects of the perceived environment are assumed to be the employees' physiological, psychological, and behavioural processes and potential sources of stress. Individual estimation is always included in the perception of the environment (Lazarus 1991).

Low social support and a poor team climate at work are considered as job stress factors. The word *stress* may be used when meant as an external stress factor, the perception of haste and stress, the body's response to stress or the long-term consequences. Stress is a disorder that results in the perception of a person that he or she is unable to cope with the demands placed on him or her. In stress situations, a person interprets the situation as a challenge or a threat (Lazarus and Folkman 1984; Seasholtz 2000).

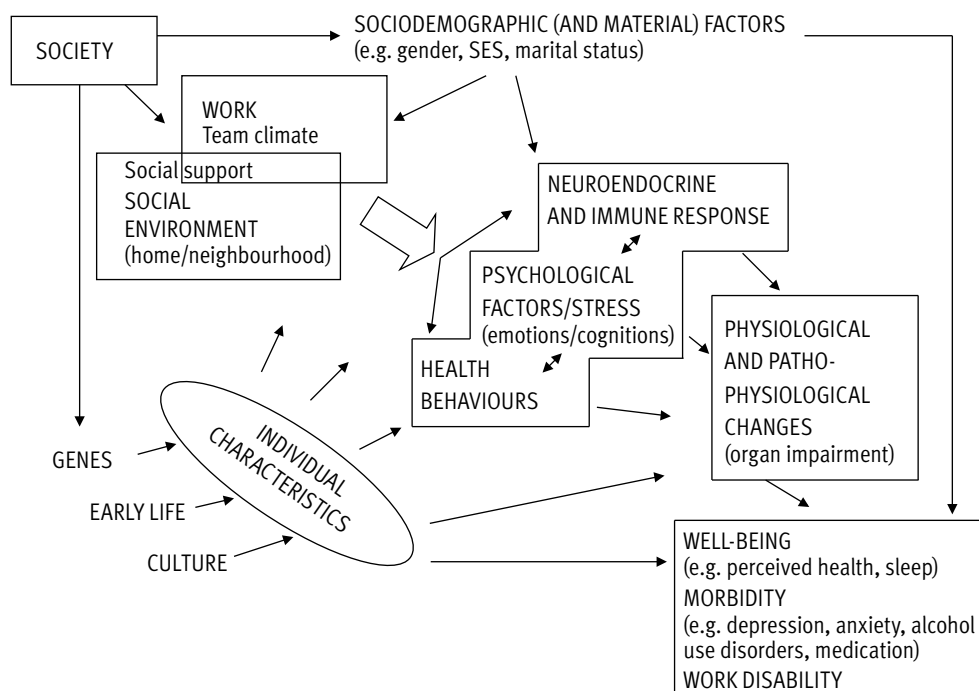
Social relations at work interact with stress and encumbrance. These relations may have a direct impact on the health of an employee. Social support and team climate may also affect employees' attitudes toward taking care of their own health. Later these factors at work may result in a worsening of work ability, and further on, even contribute to permanent work disability. All of these various health factors and social relations interact with each other. Figure 5 presents the framework of the present study, modified from Brunner and Marmot (2006).

This model links social structure to health and disease via material, psychosocial, and behavioural pathways. Genetics, early life, and cultural factors are further important influences on population health, but are out of the scope of the present study. The model traces causation from social and psychosocial processes through stress, behaviour, and biology to well-being, morbidity and work disability.

A variable may be said to function as a mediator to the extent that it accounts for the relation between the predictor and the criterion. A moderator is a qualitative (e.g., sex, race, class) or quantitative factor (e.g., level of reward) that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable. (Baron and Kenny 1986.) Whereas moderator variables specify when certain effects will hold, mediators speak to how or why such effects occur. In the framework presented in Figure 5, potential mediators are health behaviours, health perceptions, and physiological changes (not assessed

in the present study). Potential moderators are e.g. gender, socioeconomic status, and marital status. In this study, only gender is examined as a potential moderator since earlier research suggests it may have a modifying role in the association. Men and women have been found to be vulnerable to partly different psychosocial characteristics in their work and domestic environments (Väänänen 2005).

Figure 5. Potential pathways between psychosocial factors and illness.



Modified from Brunner and Marmot 2006.

2.2 Aims of the study

The aim of the present study was to examine the associations of social support and team climate at work with health in the occupational health context. The objective was to determine the associations of social support and team climate with health problems and societal consequences. The examination of health focused on mental disorders and sleep problems, and societal consequences focused on the use of antidepressants, hypnotics and sedatives, and of disability pensions. The mental disorders examined were depressive, anxiety, and alcohol use disorders.

The specific study questions were as follows:

Social factors and mental health

- 1) Are social support and work team climate related to mental disorders (Studies I and II)?
- 2) Is social support related to sleep problems (Study III)?

Social factors and societal aspect

- 3) Are social support and work team climate related to the use of antidepressants (Studies I and II) and is social support associated with the use of hypnotics and sedatives (Study III)?
- 4) Is social support related to work disability pensions (Study IV)?

Mediating and moderating factors between social factors and studied outcomes

- 5) Are there mediating factors between social support and disability pensions (Study IV)?
- 6) Are there gender differences between social support/team climate and the outcomes (Studies I, II, III, and IV)?

Furthermore, in studies of social support, social support both at work and in private life is examined.

3 METHODS

3.1 Procedure

A multidisciplinary epidemiologic health survey, the Health 2000 Study, was carried out in Finland between August 2000 and June 2001 to obtain up-to-date information on the most important national public health problems, including their causes and treatment, as well as the functional capacity and work ability of the population. The National Public Health Institute (nowadays named the National Institute for Health and Welfare) had the main responsibility for the survey. Also other Finnish social and health care organisations participated. Due to a financial imperative to set priorities, this two-stage stratified cluster sample focussed on the Finnish population (0.24% sample), aged 30 years or over, among whom illnesses are, on average, more common. The health-oriented study was comprised of 8,028 persons. (Aromaa and Koskinen 2004.)

The frame was regionally stratified according to the five university hospital districts, each serving about one million inhabitants and differing in geography, economic structure, health services, and the socio-demographic characteristics of the population. From each of the five strata, 16 health care districts were sampled as clusters, adding up to 80 districts in the whole country. Firstly, the 15 largest cities were included with a probability of one. Next, within each of the five districts, all 65 other areas were sampled, applying the Probability Proportional to Population Size (PPS) method. Finally, from each of these 80 areas, a random sample of individuals was drawn from the National Population Register, so that the total number of persons drawn from each stratum was proportional to the population size. (Aromaa and Koskinen 2004.)

People selected for the survey were first interviewed at home by trained interviewers of Statistics Finland, the Finnish National Bureau for Statistics. The structured interview took about 90 minutes and included information on socio-demographic factors, living habits (e.g. smoking), type of work, work capacity, health and illnesses, use of medication and health services, and the need for health services. The participants were given a questionnaire, which they returned when after one to six weeks they received an invitation to attend a health examination. The questionnaire covered information on functional capacity, alcohol consumption, leisure-time activities, physical activity, job strain, and depressive symptoms. The clinical health examination included a structured interview on mental health. (Aromaa and Koskinen 2004.)

During the first interview, the participants received an information leaflet on the study and their written informed consent was obtained. The Health 2000 Study was approved in 2000 by the Ethics Committee of Epidemiology and Public Health in the Hospital District of Helsinki and Uusimaa in Finland.

3.2 Participants

Of the original sample ($n = 8028$), 7,419 persons participated in at least one phase of the study. The participants accounted for 93% of the 7,977 persons alive on the day the study began. Of the 558 non-participants, 416 refused, 110 were not located, and 32 were abroad. Of the total sample, 5,871 persons were of working age (30 to 64 years). Of the original sample, participation in the interview was 87% and 84% in the clinical health examination. The non-participants were most often unemployed men or men with low income (Heistaro 2008). A significant proportion of subjects not participating to the CIDI suffered from psychic distress or symptoms of mental disorders (Pirkola et al. 2005). In the present study, only currently employed persons categorised according to their main activity were included (Figure 6).

Due to the numbers of missing values in different variables the size of the final samples in different substudies I-IV varied as shown in Table 6.

Figure 6. The selection of the study population.

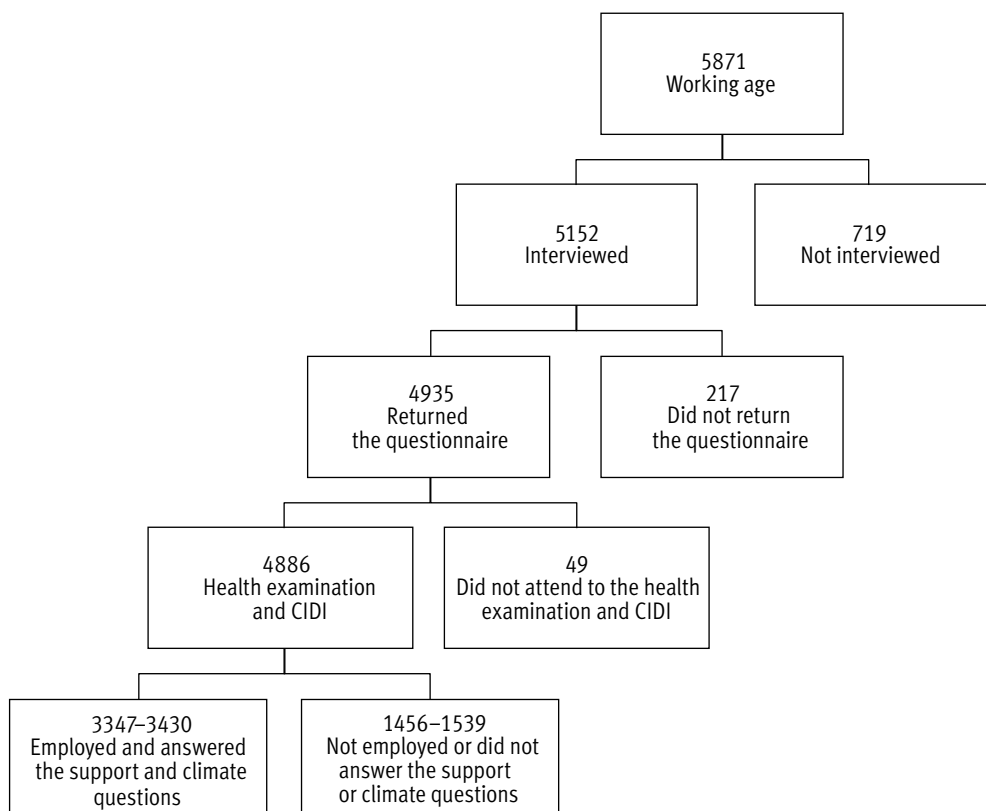


Table 6. *The size of study population.*

	Study I	Study II	Study III	Study IV
Number of participants	3429	3347	3430	3414

3.3 Measures

3.3.1 *Social support at work*

Availability of social support was measured with self-assessment scales. The measure of social support at work was from the Job Content Questionnaire (Karasek et al. 1998). The JCQ has been shown to be a valid and reliable instrument to assess job stress and social support in many occupational settings worldwide (Kawakami 1996; Niedhammer 2002; Edimansyah 2006). Separate questions assessed two different forms of social support at work: supervisor support (“When needed, my closest superior supports me”), and co-worker support (“When needed, my fellow workers support me”). These measures are general, and hence assessments of whether they measure emotional, informational, instrumental or practical support could not be carry out. Responses were given on a 5-point scale ranging from 1 (fully agree) to 5 (fully disagree). For analyses, the alternatives 1 and 2 as well as 4 and 5 were combined to make a 3-point scale. Further, the scale was reversed in order to give high values for good support. Cronbach’s alpha was 0.70 for the social support at work.

3.3.2 *Social support in private life*

The measure of social support in private life was a part of the Social Support Questionnaire by I. G. Sarason (Sarason et al. 1983; Sarason et al. 1987). The questionnaire has been shown to be a valid and reliable measure of private social support (Rasclé et al. 2005). The scale is comprised of four items (“On whose help can you really count when you feel exhausted and need relaxation?”, “Who do you think really cares about you no matter what happened to you?”, “Who can really make you feel better when you feel down?”, and “From whom do you get practical help when needed?”) reflecting different ways to give support. This measure covers aspects of emotional, instrumental, and practical support. Respondents could choose one or more of six alternatives sources of support (husband, wife or partner, some other relative, close friend, close neighbour, someone else close, no one). The score of private life support was formed by combining the sources giving support and the items reflecting the nature of support. The score ranged from 0 to 20. For analyses, the score was divided into tertiles (low 0–4, intermediate 5–8, and high 9–20). Cronbach’s alpha was 0.71 for the private life support.

3.3.3 *Team climate at work*

Team climate was measured with a self-assessment scale. The scale is included in the Healthy Organization Questionnaire of the Finnish Institute of Occupational Health (Lindström et al. 1997). It consists of four statements regarding working conditions and atmosphere in the workplace (“Encouraging and supportive of new ideas”, “Prejudiced and conservative”, “Nice and easy”, and “Quarrelsome and disagreeing”). Responses to each statement were given on a 5-point scale ranging from 1 (“I fully agree”) to 5 (“I fully disagree”). The scales of two questions were reversed in order to provide high values for good climate. The mean score was calculated and divided into tertiles (poor 1–3.25, intermediate 3.26–4.00 and good 4.01–5) for the analyses.

3.3.4 *Mental disorders*

Mental disorders were diagnosed at the end of the health examination by a computerised version of the WHO Composite International Diagnostic Interview (M-CIDI). The standardised CIDI interview is a structured interview developed by the World Health Organization (WHO), and designed for use by trained non-psychiatric health care professional interviewers. It has been shown to be a valid assessment measure of common mental non-psychotic disorders (Jordanova et al. 2004). The 21 interviewers were trained for the CIDI interview for 3–4 days by psychiatrists and physicians who had been trained by a WHO authorised trainer. Mental disorders were assessed using DSM-IV definitions and criteria. A participant was identified as a case if he/she fulfilled the criteria for depressive, anxiety, or alcohol use disorder during the past 12 months. Depressive disorders included a diagnosis of major depressive disorder (MDD) or dysthymic disorder, and anxiety disorders included diagnoses of panic disorder with or without agoraphobia, generalised anxiety disorder, social phobia NOS and agoraphobia without panic disorder. Alcohol use disorders included diagnoses of alcohol dependence and alcohol abuse.

Depressive disorders

Major depressive disorder. According to DSM-IV, a major depressive episode includes five or more of the following symptoms presented during the same 2-week period and represented a change from previous functioning; at least one of the symptoms is either a depressed mood or loss of interest or pleasure: a depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g., feels sad or empty) or observation made by others (e.g., appears tearful), markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day as indicated by either subjective account or observation made by others, significant weight loss when not dieting or weight gain (e.g., a change of more than 5% of body weight in a month), or decrease or increase in appetite nearly every day, insomnia or hypersomnia nearly every day, psychomotor agitation or retardation nearly every day (observable by

others, not merely subjective feelings of restlessness or being slowed down), fatigue or loss of energy nearly every day, feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick), diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others), or recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide (DSM-IV 2000). The symptoms do not meet criteria for a mixed episode and the symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning. The symptoms are not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition (e.g., hypothyroidism). The symptoms are not better accounted for by bereavement, i.e., after the loss of a loved one, the symptoms persist for longer than 2 months or are characterised by marked functional impairment, morbid preoccupation with worthlessness, suicidal ideation, psychotic symptoms, or psychomotor retardation. (DSM-IV 2000.)

Major depressive disorder comprises a single major depressive episode which is not better accounted for by schizoaffective disorder and is not superimposed on schizophrenia, schizophreniform disorder, delusional disorder, or psychotic disorder NOS (not otherwise specified). There has never been a manic episode, a mixed episode, or a hypomanic episode. This exclusion does not apply if all the manic-like, mixed-like, or hypomanic-like episodes are substance or treatment induced or are due to the direct physiological effects of a general medical condition. In recurrent major depressive disorder there is the presence of two or more major depressive episodes. To be considered separate episodes, there must be an interval of at least 2 consecutive months in which criteria are not met for a major depressive episode. (DSM-IV 2000.)

Dysthymia. According to the DSM-IV, dysthymia is characterised by an overwhelming yet chronic state of depression, exhibited by a depressed mood for most of the days, for more days than not, for at least 2 years. The individual who suffers from this disorder must not have gone for more than 2 months without experiencing two or more of the following symptoms: poor appetite or overeating, insomnia or hypersomnia, low energy or fatigue, low self-esteem, poor concentration or difficulty making decisions, and feelings of hopelessness. In addition, no major depressive episode has been present during the first two years and there has never been a manic episode, a mixed episode, or a hypomanic episode, and criteria have never been met for cyclothymic disorder. Further, the symptoms cannot be due to the direct physiological effects of the use or abuse of a substance such as alcohol, drugs or medication or a general medical condition. The symptoms must also cause significant distress or impairment in social, occupational, educational or other important areas of functioning. (DSM-IV 2000.)

Anxiety disorders

Panic disorder. Anxiety disorders included panic disorder with or without agoraphobia. The DSM-IV criteria for panic disorder include recurrent unexpected panic attacks. At least one of the attacks has been followed by at least 1 month of one or more of the following: Persisting concern about having additional panic attacks, worry about the implications of the attack or its consequences, and a significant change in behaviour related to the attacks. The panic attacks are not due to the direct physiologic effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition (e.g., hyperthyroidism). The panic attacks are not better accounted for by another mental disorder. (DSM-IV 2000.)

Agoraphobia. Criteria for agoraphobia are fear of being in places or situations from which escape might be difficult (or embarrassing) or in which help might not be available in the event of having unexpected panic-like symptoms. The situations are typically avoided or require the presence of a companion. The condition is not better accounted for by another mental disorder. (DSM-IV 2000.)

Social phobia. DSM-IV criteria for social phobia are a fear of one or more social or performance situations in which the person is exposed to unfamiliar people or to possible scrutiny by others and feels he or she will act in an embarrassing manner. Exposure to the feared social situation provokes anxiety, which can take the form of a panic attack, the person recognises that the fear is excessive or unreasonable, the feared social or performance situations are avoided or are endured with distress, and the avoidance, anxious anticipation, or distress in the feared situation interferes significantly with the person's normal routine, occupational functioning, or social activities or relationships. The condition is not better accounted for by another mental disorder, substance use, or general medical condition. If a general medical condition or another mental disorder is present, the fear is unrelated to it. The phobia may be considered generalised if fears include most social situations. (DSM-IV 2000.)

Generalised anxiety disorder. The DSM-IV criteria for the generalised anxiety disorder include excessive anxiety about a number of events or activities, occurring more days than not, for at least 6 months, and the person finds it difficult to control the worry. The anxiety and worry are associated with at least three of the following symptoms (with at least some symptoms present for more days than not, for the past 6 months): Restlessness or feeling keyed up or on edge, being easily fatigued, difficulty concentrating or mind going blank, irritability, muscle tension, or sleep disturbance. The focus of the anxiety and worry is not confined to features of being embarrassed in public (as in social phobia), being contaminated (as in obsessive-compulsive disorder), being away from home or close relatives (as in separation anxiety disorder), or having a serious illness (as in hypochondriasis), and the anxiety and worry do not occur exclusively during posttraumatic stress disorder. The anxiety, worry, or physical symptoms cause clinically significant distress or impairment in social or occupational functioning. The disturbance does not occur exclusively during a mood disorder, a

psychotic disorder, pervasive developmental disorder, substance use, or general medical condition. (DSM-IV 2000.)

Alcohol use disorders

Alcohol abuse. DSM-IV criteria for alcohol abuse includes a maladaptive pattern of alcohol abuse leading to clinically significant impairment or distress, as manifested by one or more of the following, occurring within a 12-month period: Recurrent alcohol use resulting in failure to fulfil major role obligations at work, school, or home (e.g., repeated absences or poor work performance related to substance use; substance-related absences, suspensions or expulsions from school; or neglect of children or household), recurrent alcohol use in situations in which it is physically hazardous (e.g., driving an automobile or operating a machine), recurrent alcohol-related legal problems (e.g., arrests for alcohol-related disorderly conduct), or continued alcohol use despite persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the alcohol (e.g., arguments with spouse about consequences of intoxication or physical fights). These symptoms must never have met the criteria for alcohol dependence. (DSM-IV 2000.)

Alcohol dependence. The criteria for alcohol dependence are a maladaptive pattern of alcohol use, leading to clinically significant impairment or distress, as manifested by three or more of the following seven criteria, occurring at any time in the same 12-month period. Tolerance, as defined by either of the following: A need for markedly increased amounts of alcohol to achieve intoxication or desired effect, or markedly diminished effect with continued use of the same amounts of alcohol. Withdrawal, as defined by either of the following: The characteristic withdrawal syndrome for alcohol (refer to DSM-IV for further details), or alcohol is taken to relieve or avoid withdrawal symptoms. Alcohol is often taken in larger amounts or over a longer period than was intended. There is a persistent desire or there are unsuccessful efforts to cut down or control alcohol use. A great deal of time is spent in activities necessary to obtain alcohol, use alcohol or recover from its effects. Important social, occupational, or recreational activities are given up or reduced because of alcohol use. Alcohol use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the alcohol (e.g., continued drinking despite recognition that an ulcer was made worse by alcohol consumption). (DSM-IV 2000.)

Lifetime mental disorders

The participants were asked about lifetime mental disorders with a single-item question asking whether a doctor had ever confirmed a diagnosis of mental disorder (yes/no).

3.3.5 *Sleeping problems*

Sleeping problems were assessed by a questionnaire focusing on symptoms of sleeping difficulties and by the use of hypnotics and sedatives. Three questions were used to measure self-reported sleeping problems (Aromaa and Koskinen 2004). 1) *Daytime tiredness* was assessed with the question “Are you usually more tired during the day-time than other people of your age (no/yes)?” 2) *Sleeping difficulties* were assessed with the question from the SCL-90 (Derogatis et al. 1973) “Have you had some of the following usual symptoms and troubles within the last month: ... sleeping disorders or insomnia...?” 3) *Sleep duration* was assessed with “How many hours do you sleep in 24 hours?” (6 hours or less, 7–8 hours, 9 hours or more).

3.3.6 *Psychotropic medication*

The use of antidepressant medication was an indirect measure of the occurrence of mental health problems. Sleeping problems were also assessed indirectly with the use of prescribed hypnotics and sedatives. The data was extracted from the National Prescription Register managed by the Social Insurance Institution of Finland. The national health insurance scheme covers all permanent residents in the country, and refunds part of the costs of prescribed medication for practically all outpatients if the medicine expenses exceed 10 Euros (2003). Each participant’s personal identification number (a unique number given to all Finns at birth and used for all contacts with the social welfare and health care systems) linked the data to information on drug prescriptions. The WHO’s Anatomical Therapeutic Chemical (ATC) classification code (WHO Collaborating Centre for Drug Statistics Methodology 2004) is the basis of categorising drugs in the prescription register of the Social Insurance Institution.

All the prescriptions coded as N06A (the ATC code for antidepressants) and N05C (the ATC code for hypnotics) were extracted from January 1st, 2001 to December 31st, 2003. The follow-up time for antidepressant and hypnotic drug purchases was three years for all participants.

3.3.7 *Disability pensions*

There are two complementary pension systems in Finland. Earnings-related pension is linked to past employment and national pension is linked to residence in Finland. Disability pension may be granted to a person aged less than 65 (since 2005 aged less than 63 years), who has a chronic disease, defect or injury which reduces the person’s work ability and whose incapacity for work is expected to last for at least one year. Disability pension may be granted either until further notice or in the form of a cash rehabilitation benefit for a specific period of time. The disability pension may be awarded to the amount of a full pension if the work ability has been reduced by at least 3/5, or a partial pension if the reduction is 2/5–3/5. A special form of disability

pension is the individual early retirement pension, which is no longer available, but during this study it was possible to be granted to persons born in 1943 or earlier. A further precondition was that the person's work ability had been reduced permanently to the extent that he or she could not be expected to continue in the current job or a job which corresponds to his or her occupation or profession.

Yearly data on the disability pensions of the participants were extracted from the records of the Finnish Centre of Pensions and the Social Insurance Institution of Finland. The participant was identified as a case if he/she had been granted a disability pension or an individual early retirement pension between January 1, 2001 and December 31, 2006.

3.3.8 Socio-demographic factors

Of the covariates, socio-demographic variables included age, gender, marital status, and occupational grade. Marital status was divided into two categories: married/cohabiting and divorced/widowed/single. Occupational grades were formed on the basis of occupation and type of employment: upper grade non-manual employees, lower grade non-manual employees, manual workers, and self-employed. In study III socio-demographic variables included also children aged < 7 years in the household (yes/no).

3.3.9 Other covariates

In study IV, physical illnesses diagnosed by a physician during the clinical health examination were used. In the health examination, first a symptom interview was carried out. After several measurements the research physician took a history and performed a standard 30-minute clinical examination. The diagnostic criteria of the physical illnesses were based on current clinical practice. In the present study, the participant was identified as having a physical illness if he/she fulfilled the diagnostic criteria for at least one musculoskeletal disorder, cardiovascular disease, respiratory disease, or other physical illness.

Perceived health was measured with a question on self-reported health status. Health status was evaluated with a 5-point scale ranging from 1 (good) to 5 (poor). Alternatives 1 and 2 (perceived good health) as well as 3, 4, and 5 (perceived non-optimal health) were combined to make a 2-point scale (Idler and Benyamini 1997).

Health behaviours assessed covered smoking, alcohol consumption, daily drinking of coffee or tea, physical activity during leisure time, and body mass index (BMI). Regular smoking (yes/no) and daily drinking of coffee or tea (yes/no) were assessed in the home interview, and high alcohol consumption (average weekly consumption ≥ 190 g of absolute alcohol for women and ≥ 275 g for men) (Kaprio et al. 1987) was

assessed with the questionnaire. Answering “at least 30 minutes exercise 4 times or more per week” during leisure time was the criterion for physical activity used in the questionnaire. BMI ($\geq 30 \text{ kg/m}^2$) was calculated on the basis of the clinical measurements taken during the health examination.

Work related factors were job tenure (years), shift work (yes/no), job demands, and job control. Job demands and job control were measured with self-assessment scales. The measures were from the Job Content Questionnaire (Karasek et al. 1998). The scale of job demands was comprised of five items (e.g., “My job requires working very fast”). The scale of job control was comprised of nine items (e.g., “My job allows me to make a lot of decisions on my own”). Responses were given on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Mean scores of job demands and job control were treated as continuous variables.

3.4 Statistical analyses

Descriptive statistics were presented for each variable by gender and comparisons were made using the χ^2 test or Wilcoxon’s test. Binary logistic regression models were used to calculate adjusted odds ratios and their 95% confidence intervals 1) for having any of the 12-month depressive or anxiety disorders, 2) for having made at least one purchase of antidepressants, 3) for having an alcohol use disorder, 4) for having any of the four types of sleep problems, and 5) for having made at least one purchase of hypnotics and sedatives during the 3-year period. Analyses of the association of these outcomes with social support (Studies I and III) and team climate (Study II) were progressively adjusted for the potential confounding factors, by adding first sociodemographic factors (i.e. age, gender, marital status, occupational grade, and, in Study III, children aged under 7 years in the household and shift work), and then in Study III further perceived health and health behaviours (i.e., physical activity during leisure time, body mass index, alcohol consumption, smoking and daily drinking of coffee or tea). The analyses regarding the use of antidepressants or hypnotics and sedatives were lastly adjusted for the use of the medication at the time of the baseline study. Interaction effects between gender and social support (Studies I and III) and team climate (Study II) were also tested. If any significant interactions emerged between gender and social support or team climate the genders were analysed separately.

In study IV, associations between social support and baseline health indicators were examined to see the potential health-related mediators between social support and disability pension. Sequentially adjusted logistic regression analyses were used to calculate the odds ratios and their 95% confidence intervals for new disability pensions during the follow-up in relation to social support at work and in private life. The logistic regression analyses were adjusted for baseline covariates, health indicators, and health behaviours progressively: first age, gender, marital status, and occupational grade, then smoking, alcohol consumption, physical activity during leisure time, and BMI. The analyses were then adjusted in turn for chronic physical illnesses, common

mental disorders, and sleeping problems and each of these analyses was finally adjusted for perceived health. Analyses regarding social support in private life were not adjusted for marital status, because marital status is closely related to getting support in private life. Interaction effects between gender and social support predicting disability pensions were also tested.

Sampling parameters and weighting adjustment were used in the analyses to account for the survey design complexities, including clustering in a stratified sample, and non-participation (Lehtonen et al. 2003; Aromaa and Koskinen 2004). The purpose of sampling adjustment was to adjust for the effect of non-response on the final attained sample and to return the final data to be representative for the target population of the survey. In addition to each individual's inclusion probability, health centre district indicator, university hospital district indicator, age, gender, and native language were used to calibrate the weighting parameters (Heistaro 2008). The data was analysed using the SAS 9.1/ the SUDAAN 9 software. SUDAAN has been specifically designed to analyse cluster-correlated data in complex sample surveys (Ytterdahl and Gulbrandsen 1997).

4 RESULTS

The results are presented in accordance with study questions 1–4 and, in addition, results regarding questions 5–6 are presented. Firstly, the significance of social support at work is compared with private life support in DSM-IV psychiatric disorders (depressive and anxiety disorders) (Study I). Secondly, the associations between team climate at work and mental health, as indicated by DSM-IV depressive, anxiety or alcohol use disorders are presented (Study II). Thirdly, associations between social support at work and in private life, and self-reported sleeping problems are examined (Study III). Fourthly, the associations of social support and team climate at work with employees' recorded purchases of prescribed antidepressants and hypnotics and sedatives are examined with a 3-year follow-up period (Studies I, II and III). Finally, the contribution of social support at work and in private life to forthcoming disability pension during a six year follow-up period is investigated (Study IV). Gender interactions are presented in each study question. Mediating factors including health perceptions or health behaviours are examined regarding questions 1 to 4.

Table 7 presents descriptive statistics of the study population. Compared to men, women had more commonly non-manual occupations and were more likely to be divorced, widowed or single. A higher proportion of women than men also reported lifetime mental disorders. A greater proportion of women had depressive or anxiety disorder and also had higher antidepressant and sleeping medication usage during the follow-up period. About 9% of the participants suffered from depressive or anxiety disorder. Alcohol use disorder was more common among men compared to women (8% and 2%, respectively).

About 27% of the participants suffered from sleeping difficulties within the last month (Table 8, p. 58). Women reported more commonly sleeping difficulties within the last month than men. About 12% of the participants reported sleeping only 6 hours or less per night and 7% reported sleeping 9 hours or more per night. Men had more commonly short sleep duration (15.9% vs. 11.3%) and women more commonly than men long sleep duration (9.9% vs. 4.7%). Daytime tiredness was equally common among genders. About 18% of men and women reported daytime tiredness.

About one fourth of the participants were smokers (21% of women and 29% of men) (Table 9, pp. 58–59). Almost one tenth of the participants had high alcohol consumption, 4% of women (average weekly consumption ≥ 190 g of absolute alcohol) and 15% of men (≥ 275 g). BMI was 30 or higher in 19% of the participants, equally among genders. Nearly one fifth of the participants did physical exercise during leisure time 4 or more times per week (23% of women and 19% of men). About 57% of the participants suffered from some physical illnesses (59% of women and 55% of men) and 24% perceived their health as non-optimal (22% of women and 26% of men). Altogether, 257 participants (7.5%) were granted a disability pension during the 6-year follow-up (8% of women and 7% of men).

Women reported getting more social support both at work (mean, 4.0 and 3.8, respectively) and in private life (mean, 7.4 and 6.3, respectively) than men. No gender difference in the perceived team climate was found (Table 10, p. 59).

Table 7. Characteristics of the participants in study II (n = 3347).

Characteristics	Women (n = 1684)		Men (n = 1663)		p
	Mean (SD)	Number (weighted %)	Mean (SD)	Number (weighted %)	
Age	44.64 (8.36)		44.11 (8.43)		0.069
Occupational grade					< 0.0001
Higher non-manual		490 (29)		455 (27)	
Lower non-manual		662 (39)		260 (16)	
Manual		356 (21)		638 (39)	
Self employed		172 (10)		302 (18)	
Marital status					0.0009
Married/co-habiting		1283 (76)		1342 (81)	
Single, divorced or widowed		401 (24)		321 (19)	
Lifetime mental disorder ^a					< 0.0001
No		1469 (89)		1540 (93)	
Yes		188 (11)		123 (7)	
Depressive, anxiety, or alcohol use disorder during past 12 months ^b					0.81
No		1468 (87)		1455 (88)	
Yes		216 (13)		208 (12)	
Depressive disorder ^b					< 0.0001
No		1538 (91)		1598 (96)	
Yes		146 (9)		65 (4)	
Anxiety disorder ^b					0.0072
No		1602 (95)		1610 (97)	
Yes		82 (5)		53 (3)	
Alcohol use disorder ^b					< 0.0001
No		1658 (98)		1536 (92)	
Yes		26 (2)		127 (8)	
Antidepressant use					< 0.0001
No		1492 (89)		1568 (94)	
Yes		192 (11)		95 (6)	

^aSelf-reported information on doctor-diagnosed mental disorder.

^bDiagnosis based on the CIDI interview.

Table 8. Sleep problems of the participants in study III ($n = 3430$).

Characteristics	Women (n = 1731) Number (weighted %)	Men (n = 1699) Number (weighted %)	p
Daytime tiredness			0.98
No	1064 (81.8)	962 (81.8)	
Yes	236 (18.2)	212 (18.2)	
Sleeping difficulties within the last month			0.0003
No	1212 (69.7)	1279 (75.3)	
Yes	517 (30.3)	417 (24.7)	
Sleep duration			< 0.0001
6 hours or less	181 (11.3)	246 (15.9)	
7–8 hours	1293 (78.8)	1224 (79.3)	
9 hours or more	165 (9.9)	74 (4.7)	
Sleeping medicine during 2001–2003			0.010
No	1645 (94.9)	1642 (96.7)	
Yes	86 (5.1)	57 (3.3)	

Table 9. Health behaviours, physical illnesses, perceived health, and disability pensions of the study IV population ($n = 3414$).

Characteristics	Men (n = 1690) Number (weighted %)	Women (n = 1724) Number (weighted %)	p
Smoking			< 0.0001
No	1201 (71.0)	1362 (79.2)	
Yes	489 (29.0)	361 (20.8)	
High alcohol consumption ^a			< 0.0001
No	1445 (85.5)	1654 (96.0)	
Yes	244 (14.5)	69 (4.0)	
High BMI ^b			0.619
No	1381 (81.7)	1402 (81.1)	
Yes	307 (18.3)	321 (18.9)	
Physical activity ^c			0.0007
Yes	318 (18.8)	401 (23.3)	
No	1371 (81.2)	1317 (76.7)	
Physical illnesses ^d			0.0176
No	759 (45.4)	711 (41.4)	
Yes	904 (54.6)	987 (58.6)	

Table 5 continues.

Characteristics	Men (n = 1690) Number (weighted %)	Women (n = 1724) Number (weighted %)	p
Perceived non-optimal health			0.0207
No	1260 (74.5)	1356 (78.2)	
Yes	429 (25.5)	368 (21.8)	
Disability pension ^e			0.185
No	1571 (92.9)	1586 (91.7)	
Yes	119 (7.1)	138 (8.4)	

^a Average weekly consumption ≥ 190 g of absolute alcohol for women and ≥ 275 g for men.

^b Body mass index ≥ 30 kg/m².

^c Physical activity during leisure time four times per week or more.

^d Physical illnesses diagnosed by a physician during the clinical health examination.

^e Disability pensions extracted from the register of the Finnish Centre for Pensions.

Table 10. Social support (Study IV) and team climate (Study II).

Characteristics	Men		Women		p
	Mean (SD)	Number (weighted %)	Mean (SD)	Number (weighted %)	
Social support at work (1–5)	3.84 (0.97)		3.97 (0.91)		< 0.0001
From supervisor					0.001
Low		301 (17.8)		256 (14.9)	
Intermediate		278 (16.5)		233 (13.5)	
High		1111 (65.7)		1235 (71.5)	
From co-workers					0.020
Low		122 (7.3)		113 (6.6)	
Intermediate		210 (12.4)		165 (9.5)	
High		1358 (80.3)		1446 (83.9)	
Social support in private life (0–20)	6.33 (2.94)		7.39 (2.99)		<0.0001
Low		638 (37.8)		382 (22.5)	
Intermediate		703 (41.5)		785 (45.5)	
High		349 (20.7)		557 (32.0)	
Team climate at work					0.16
Poor		596 (36)		556 (33)	
Intermediate		547 (33)		553 (33)	
Good		520 (31)		575 (34)	

4.1 Association of social factors at work with mental health and sleeping problems

4.1.1 *Mental disorders (Studies I and II)*

Low and intermediate social support at work from both supervisors and co-workers and low social support in private life were related to a higher probability of having a depressive or anxiety disorder (or both) (Table 11). A statistically significant interaction was seen between gender and social support from co-workers ($p = 0.016$). Low social support from co-workers was associated with 12-month depressive/anxiety disorders in men. In women, only intermediate, but not low, support from co-workers was associated with those mental disorders (Table 12).

Separate analyses were also made for depressive and anxiety disorders as an outcome (not shown in the table). Results were similar except that some of the associations between anxiety disorders and social support were weaker.

As a sensitivity analysis, social support in private life was examined using those with no support at all as a reference group. There were only 13 individuals who had no support in their private life. In this group, the risk for having a depressive or anxiety disorder was 5.24-fold (95% CI 1.38–19.86, $p = 0.0025$). With covariates this association was not statistically significant ($p = 0.077$). Regarding the source of support, only low spousal support was related to DSM-IV depressive and anxiety disorders (OR 1.86 and 95% CI 1.21–2.86).

Team climate was not associated with alcohol use disorders (Table 13, p. 62). Poor team climate was associated with a 2.10-fold probability of having a depressive disorder and a 1.72-fold probability of having an anxiety disorder. When adjusted for job demands and job control, the significance of the association between team climate and anxiety disorders was attenuated. No statistically significant interaction effect between gender or age and team climate was found regarding mental disorders.

4.1.2 *Sleeping problems (Study III)*

Daytime tiredness

When compared with high social support, low social support from the supervisor was related to tiredness with an OR of 1.68 (95% CI 1.26–2.23) after adjustments and the respective odds related to intermediate support was 1.45 (1.03–2.06). Also low and intermediate support from co-workers was related to tiredness in the fully adjusted model (OR 1.55 and OR 2.04, respectively). The association for private life support found in the unadjusted model failed to reach significance after adjustments (Table 14, p. 63).

Table 11. 12-month prevalence of DSM-IV depressive or anxiety disorders according to social support in study I. Odds ratios (OR) and 95% confidence intervals (CI).

Social support	Univariate		With covariates ^a	
	p	OR (95% CI)	p	OR (95% CI)
From supervisor	< 0.0001		< 0.0001	
High (n = 2267)		1.00		1.00
Intermediate (n = 499)		1.64 (1.19–2.26)		1.76 (1.24–2.51)
Low (n = 541)		2.27 (1.70–3.02)		2.02 (1.48–2.82)
From colleagues	< 0.0001		< 0.0001	
High (n = 2731)		1.00		1.00
Intermediate (n = 367)		2.20 (1.59–3.04)		2.12 (1.48–3.04)
Low (n = 224)		2.07 (1.41–3.05)		1.65 (1.05–2.59)
In private life	0.010		0.04	
High (n = 917)		1.00		1.00
Intermediate (n = 1467)		1.38 (0.99–1.92)		1.35 (0.96–1.91)
Low (n = 1019)		1.68 (1.20–2.35)		1.62 (1.12–2.36)

^a Support from the supervisor and from colleagues adjusted for age, gender, marital status, occupational grade and lifetime mental disorders and private life support adjusted for age, gender, occupational grade and lifetime mental disorders. Separate analysis for each dimension of social support.

Table 12. 12-month prevalence of DSM-IV depressive or anxiety disorders according to social support from colleagues in women and men in study I. Odds ratios (OR) and 95% confidence intervals (CI)^a.

Social support	p	OR (95% CI)
Women		
Support from colleagues	0.006	
High (n = 1406)		1.00
Intermediate (n = 162)		2.03 (1.31–3.14)
Low (n = 107)		0.98 (0.51–1.88)
Men		
Support from colleagues	< 0.0001	
High (n = 1325)		1.00
Intermediate (n = 205)		2.41 (1.31–4.44)
Low (n = 117)		4.03 (1.94–8.34)

^a Adjusted for age, marital status, occupational grade and lifetime mental disorders.

Table 13. 12-month prevalence of DSM-IV depressive, anxiety, and alcohol use disorders according to team climate (Study II). Odds ratios (OR) and 95% confidence intervals (CI).

Team climate	Model 1 ^a OR (95% CI)	Model 2 ^b OR (95% CI)	Model 3 ^c OR (95% CI)	Model 4 ^d OR (95% CI)	Model 5 ^e OR (95% CI)
Depressive disorder	p < 0.0001	p < 0.0001	p < 0.0001	p < 0.0001	p = 0.002
Poor (n = 1152)	2.32 (1.64–3.29)	2.44 (1.72–3.46)	2.45 (1.72–3.48)	2.10 (1.48–2.99)	1.61 (1.10–2.36)
Intermediate (n = 1100)	0.98 (0.63–1.51)	1.00 (0.64–1.55)	1.05 (0.68–1.63)	0.96 (0.61–1.50)	0.86 (0.55–1.36)
Good (n = 1095)	1.00	1.00	1.00	1.00	1.00
Anxiety disorder	p = 0.009	p = 0.007	p = 0.006	p = 0.058	p = 0.38
Poor	1.98 (1.27–3.07)	2.02 (1.30–3.14)	2.08 (1.33–3.25)	1.72 (1.09–2.70)	1.26 (0.76–2.08)
Intermediate	1.57 (0.99–2.50)	1.59 (1.00–2.54)	1.69 (1.05–2.72)	1.57 (0.97–2.55)	1.44 (0.86–2.40)
Good	1.00	1.00	1.00	1.00	1.00
Alcohol use disorder	p = 0.15	p = 0.22	p = 0.35	p = 0.44	p = 0.56
Poor	1.41 (0.95–2.07)	1.34 (0.90–1.99)	1.26 (0.85–1.87)	1.19 (0.80–1.76)	1.06 (0.70–1.62)
Intermediate	1.43 (0.93–2.20)	1.41 (0.91–2.17)	1.36 (0.87–2.11)	1.33 (0.86–2.06)	1.29 (0.81–2.00)
Good	1.00	1.00	1.00	1.00	1.00

^a Without covariates.

^b Adjusted for age and gender.

^c Adjusted for age, gender, marital status and occupational grade.

^d Adjusted for age, gender, marital status, occupational grade and self-reported lifetime mental disorders.

^e Adjusted for age, gender, marital status, occupational grade, self-reported lifetime mental disorders, job tenure, job control, and job demands.

Table 14. Daytime tiredness according to social support (Study III). Odds ratios (OR) and 95% confidence intervals (CI).

Social support	Model 1 ^a		Model 2 ^b		Model 3 ^c	
	p	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)
From supervisor	<0.0001		<0.0001		<0.0001	
High (n = 2357)		1.00		1.00		1.00
Intermediate (n = 514)		1.50 (1.12–2.02)		1.55 (1.13–2.12)		1.45 (1.03–2.06)
Low (n = 559)		2.00 (1.54–2.60)		2.08 (1.58–2.74)		1.68 (1.26–2.23)
From co-workers	<0.0001		<0.0001		<0.0001	
High (n = 2816)		1.00		1.00		1.00
Intermediate (n = 377)		2.12 (1.58–2.85)		2.13 (1.58–2.89)		2.04 (1.47–2.85)
Low (n = 237)		2.00 (1.54–2.60)		1.70 (1.15–2.52)		1.55 (1.02–2.37)
In private life ^d	0.073		0.24		0.017	
High (n = 907)		1.00		1.00		1.00
Intermediate (n = 1494)		0.96 (0.74–1.23)		0.92 (0.72–1.18)		0.84 (0.64–1.09)
Low (n = 1029)		1.37 (1.06–1.78)		1.28 (0.97–1.69)		1.07 (0.79–1.44)

^a Without covariates.

^b Adjusted for age, gender, marital status, occupational grade, children under 7 years in the household, and shift work.

^c Adjusted further for perceived health, physical activity during leisure time, body mass index, alcohol consumption, smoking, and daily drinking of coffee or tea.

^d Social support in private life not adjusted for marital status.

Sleeping difficulties within the last month

Both low and intermediate support from supervisors (OR 1.74 and OR 1.53, respectively) was associated with sleeping difficulties after adjustments. A statistically significant interaction effect between gender and support in private life on sleeping difficulties was found. Low support in private life was associated with sleeping difficulties among women but not among men (Table 15).

Sleep duration

About 12% of the participants reported sleeping only 6 hours or less per night and 7% reported sleeping 9 hours or more per night. Low supervisor support was associated with short sleep duration in the model adjusted for socio-demographic and occupational covariates (OR 1.47), but the association attenuated in the fully adjusted model (Table 16, p. 66). Supervisor support assessed as intermediate, when compared with high, was related to lower odds of long sleep duration (OR 0.52). A statistically significant interaction effect was found between gender and co-worker support on sleep duration. Low and intermediate social support from co-workers was associated with higher probability of short sleep duration among women after all adjustments (OR 2.06 and OR 1.66, respectively). Low and intermediate co-worker support was related to long sleep duration among men in the unadjusted model but the association attenuated when it was fully adjusted. Low social support in private life was significantly associated with short but not with long sleep duration.

4.2 Societal aspect

4.2.1 Antidepressant use (Studies I and II)

During the follow-up period, 11% of women and 6% of men had purchased antidepressant medication at least once ($p < 0.001$). Low support from both supervisor and co-workers was associated with antidepressant use (OR 1.81 and OR 2.02, respectively) while low private life support was not a significant predictor of antidepressant use (Table 17, p. 67). No interaction with gender was found in the association between social support and antidepressant use. In Study II, the fully adjusted model showed that poor team climate predicted antidepressant use with an odds ratio of 1.53 (Table 18, p. 67). No interaction effect between gender and team climate was found for antidepressant use.

Table 15. Sleeping difficulties within the last month according to social support (Study II). Odds ratios (OR) and 95% confidence intervals (CI).

Social support	Model 1 ^a		Model 2 ^b		Model 3 ^c	
	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)
From supervisor	< 0.0001		< 0.0001		< 0.0001	
High (n = 2357)		1.00		1.00		1.00
Intermediate (n = 514)		1.51 (1.23–1.85)		1.60 (1.28–1.98)		1.53 (1.22–1.92)
Low (n = 559)		1.85 (1.52–2.25)		1.99 (1.63–2.43)		1.74 (1.41–1.92)
From co-workers	< 0.0001		< 0.0001		< 0.0001	
High (n = 2816)		1.00		1.00		1.00
Intermediate (n = 377)		1.50 (1.18–1.91)		1.56 (1.23–1.98)		1.48 (1.14–1.91)
Low (n = 237)		1.95 (1.48–2.57)		1.93 (1.46–2.57)		1.77 (1.32–2.36)
In private life ^{d,e}						
Men	0.055		0.24		0.41	
High (n = 349)		1.00		1.00		1.00
Intermediate (n = 706)		0.97 (0.71–1.32)		0.95 (0.69–1.30)		0.90 (0.65–1.25)
Low (n = 237)		1.27 (0.96–1.70)		1.15 (0.86–1.55)		1.07 (0.79–1.45)
Women	< 0.0001		0.001		0.021	
High (n = 558)		1.00		1.00		1.00
Intermediate (n = 788)		1.21 (0.94–1.57)		1.11 (0.85–1.45)		1.04 (0.79–1.37)
Low (n = 385)		2.01 (1.52–2.65)		1.68 (1.25–2.24)		1.46 (1.08–1.93)

^a Without covariates.^b Adjusted for age, gender, marital status, occupational grade, children aged under 7 years in the household, and shift work.^c Adjusted further for perceived health, physical activity during leisure time, body mass index, alcohol consumption, smoking, and daily drinking of coffee or tea.^d Social support in private life not adjusted for marital status.^e p = 0.02 for interaction gender*social support in private life.

Table 16. Sleep duration according to social support (Study III). Odds ratios (OR) and 95% confidence intervals (CI).

Social support	Model 1 ^a		Model 2 ^b		Model 3 ^c	
	Short ^d OR (95% CI)	Long ^e OR (95% CI)	Short ^d OR (95% CI)	Long ^e OR (95% CI)	Short ^d OR (95% CI)	Long ^e OR (95% CI)
From supervisor	p = 0.009		p = 0.007		p = 0.015	
High	1.00	1.00	1.00	1.00	1.00	1.00
Intermediate	1.21 (0.91–1.60)	0.54 (0.33–0.89)	1.23 (0.91–1.65)	0.56 (0.34–0.93)	1.22 (0.90–1.64)	0.52 (0.31–0.86)
Low	1.39 (1.04–1.86)	1.11 (0.78–1.59)	1.47 (1.08–1.99)	1.13 (0.79–1.63)	1.37 (0.99–1.89)	1.02 (0.70–1.48)
From co-workers ^f						
Men	p = 0.040		p = 0.088		p = 0.190	
High	1.00	1.00	1.00	1.00	1.00	1.00
Intermediate	1.18 (0.80–1.74)	1.93 (1.07–3.49)	1.21 (0.82–1.79)	1.90 (1.04–3.47)	1.12 (0.80–1.74)	1.67 (0.90–3.11)
Low	1.30 (0.79–2.13)	2.22 (1.06–4.64)	1.23 (0.70–2.17)	2.11 (0.92–4.85)	1.19 (0.67–2.11)	2.08 (0.92–4.72)
Women	p < 0.001	p = 0.002	p = 0.007			
High	1.00	1.00	1.00	1.00	1.00	1.00
Intermediate	1.63 (1.02–2.59)	1.23 (0.75–2.01)	1.59 (0.99–2.56)	1.23 (0.75–2.00)	1.66 (1.02–2.70)	1.16 (0.70–1.92)
Low	2.45 (1.51–3.96)	1.52 (0.81–2.85)	2.24 (1.36–3.69)	1.69 (0.89–3.22)	2.06 (1.22–3.47)	1.59 (0.84–3.01)
In private life ^g	p < 0.0001		p = 0.003		p = 0.007	
High	1.00	1.00	1.00	1.00	1.00	1.00
Intermediate	1.22 (0.95–1.58)	1.05 (0.78–1.43)	1.08 (0.83–1.41)	1.21 (0.89–1.65)	1.04 (0.79–1.37)	1.19 (0.87–1.63)
Low	2.01 (1.54–2.61)	0.99 (0.72–1.38)	1.55 (1.17–2.04)	1.44 (1.00–2.07)	1.49 (1.13–1.98)	1.38 (0.95–2.01)

^a Without covariates; ^b Adjusted for age, gender, marital status, occupational grade, children under 7 years in the household, and shift work; ^c Adjusted further for perceived health, physical activity during leisure time, body mass index, alcohol consumption, smoking, and daily drinking of coffee or tea; ^d Sleep duration six hours or less; ^e Sleep duration nine hours or more; ^f p = 0.0034 for interaction gender*co-worker support; ^g Social support in private life not adjusted for marital status.

Table 17. Odds ratios (OR) and 95% confidence intervals (CI) for antidepressant use according to the level and source of social support^a (Study I).

Social support	p	OR (95% CI)
From supervisor	0.003	
High (n = 2267)		1.00
Intermediate (n = 499)		0.76 (0.43–1.34)
Low (n = 541)		1.81 (1.23–2.67)
From colleagues	0.008	
High (n = 2731)		1.00
Intermediate (n = 367)		1.63 (1.03–2.60)
Low (n = 224)		2.02 (1.19–3.44)
In private life	0.42	
High (n = 917)		1.00
Intermediate (n = 1467)		0.91 (0.62–1.33)
Low (n = 1019)		1.19 (0.80–1.76)

^a Support from the supervisor and from colleagues adjusted for age, gender, marital status, occupational grade, lifetime mental disorders and CIDI diagnoses at baseline and private life support adjusted for age, gender, occupational grade, lifetime mental disorders and CIDI diagnoses at baseline. Separate analysis for each dimension of social support.

Table 18. Odds ratios (OR) and 95% confidence intervals (CI) for antidepressant use according to the team climate at work (Study II).

Team climate	Model 1 ^a OR (95% CI)	Model 2 ^b OR (95% CI)	Model 3 ^c OR (95% CI)	Model 4 ^d OR (95% CI)	Model 5 ^e OR (95% CI)	Model 6 ^f OR (95% CI)
	p < 0.0001	p < 0.0001	p < 0.0001	p = 0.012	p = 0.02	p = 0.027
Poor (n = 1152)	2.01 (1.44–2.80)	2.08 (1.48–2.92)	2.08 (1.48–2.92)	1.56 (1.07–2.27)	1.50 (1.02–2.19)	1.53 (1.02–2.30)
Intermediate (n = 1100)	1.11 (0.79–1.56)	1.12 (0.80–1.59)	1.14 (0.81–1.62)	0.93 (0.64–1.35)	0.91 (0.62–1.32)	0.95 (0.65–1.41)
Good (n = 1095)	1.00	1.00	1.00	1.00	1.00	1.00

^a Without covariates.

^b Adjusted for age and gender.

^c Adjusted for age, gender, marital status and occupational grade.

^d Adjusted for age, gender, marital status, occupational grade and self-reported lifetime mental disorders.

^e Adjusted for age, gender, marital status, occupational grade, self-reported lifetime mental disorders and DSM-IV mental disorders at baseline.

^f Adjusted for age, gender, marital status, occupational grade, self-reported lifetime mental disorders, DSM-IV mental disorders at baseline, job tenure, job demands, and job control.

4.2.2 Use of hypnotics and sedatives (Study III)

Altogether, 143 persons (4.2%) in Study III had received a refund for their purchases of hypnotics or sedatives during 2001-2003. Low supervisor support was associated with the use of these drugs after adjustments for socio-demographic, occupational, and health-related covariates (OR 1.65), but the association failed to reach significance when adjusted for hypnotics and sedatives use at baseline (Table 19). Co-worker support was not related to hypnotics and sedatives use. Low private life support was marginally associated with the use of hypnotics or sedatives before (OR 1.56), but not after adjustment for covariates and baseline use of these drugs.

4.2.3 Disability pensioning during the follow-up period (Study IV)

The associations of social support with potential mediators (physical and mental health status, sleeping difficulties, and perceived health at baseline) were analysed (Table 20, p. 70). The associations of low social support with all these health indicators were significant except that between low support from co-workers and physical illnesses. The data was reanalysed with perceived health as a 3-category variable. This analysis replicated the original findings (figures not shown). There were only 123 participants who perceived their health as poor and 674 participants who perceived their health as average.

Altogether, 257 persons (7.5%) in Study IV were granted a disability pension during the 6-year follow-up. Low social support from supervisors was associated with subsequent disability pension in the model without covariates (Table 21, p. 71). The odds related to being granted a disability pension with low support from supervisors was 1.44. This association remained significant after adjustment for socio-demographic factors, health behaviours, and either physical illnesses, mental disorders or sleeping problems. However, after adjustment for perceived health, the association attenuated and failed to reach significance.

Low social support from co-workers was related to a 1.56-fold odds of subsequent disability pension compared to high support in an unadjusted model. Low social support in private life was related to a 1.94-fold odds of subsequent disability pension compared to high support in an unadjusted model. However, after adjustment for socio-demographic factors, neither of these associations remained statistically significant. No interaction effect between gender and any forms of social support was found for subsequent disability pensions.

To examine whether there was bias due to a shorter follow-up time among the oldest participants, the data was reanalysed by excluding the participants who were 60 years or older at baseline. This subgroup analysis replicated the original findings (data not shown).

Table 19. Use of hypnotics and sedatives during 3-year follow-up according to social support (Study III). Odds ratios (OR) and 95% confidence intervals (CI).

Social support	Model 1 ^a		Model 2 ^b		Model 3 ^c		Model 4 ^d	
	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)
From supervisor	0.001		< 0.0001		< 0.0001		0.57	
High (n = 2357)		1.00		1.00		1.00		1.00
Intermediate (n = 514)		1.09 (0.65–1.83)		1.09 (0.64–1.85)		0.98 (0.56–1.71)		1.26 (0.67–2.35)
Low (n = 559)		2.02 (1.41–2.90)		1.95 (1.34–2.83)		1.65 (1.11–2.46)		1.32 (0.75–2.32)
From co-workers	0.195		0.392		0.478		0.76	
High (n = 2816)		1.00		1.00		1.00		1.00
Intermediate (n = 377)		0.90 (0.50–1.61)		0.89 (0.49–1.62)		0.89 (0.49–1.61)		0.76 (0.30–1.90)
Low (n = 237)		1.61 (0.94–2.74)		1.43 (0.82–2.48)		1.37 (0.78–2.38)		1.14 (0.56–2.32)
In private life ^e	0.064		0.172		0.319		0.29	
High (n = 907)		1.00		1.00		1.00		1.00
Intermediate (n = 1494)		1.07 (0.66–1.72)		1.01 (0.61–1.67)		0.97 (0.57–1.63)		0.78 (0.45–1.37)
Low (n = 1029)		1.56 (1.00–2.45)		1.44 (0.87–2.38)		1.31 (0.76–2.26)		0.60 (0.31–1.14)

^a Without covariates.

^b Adjusted for age, gender, marital status, occupational grade, children under 7 years in the household, and shift work.

^c Adjusted further for perceived health, physical activity during leisure time, body mass index, alcohol consumption, smoking, and daily drinking of coffee or tea.

^d Adjusted further for the use of sleep medication at baseline.

^e Social support in private life not adjusted for marital status.

Table 20. Odds ratios (OR) and 95% confidence intervals (CI) for illnesses according to the level and source of social support (Study IV).

Social support	Physical illnesses		Mental disorders		Sleeping difficulties		Perceived non-optimal health	
	p	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)
From supervisor	0.052		< 0.0001		< 0.0001		< 0.0001	
Low		1.21 (1.01–1.46)		2.16 (1.63–2.88)		1.86 (1.53–2.27)		2.18 (1.80–2.65)
Intermediate		0.92 (0.76–1.14)		1.54 (1.12–2.12)		1.51 (1.23–1.86)		1.52 (1.21–1.89)
High		1.00		1.00		1.00		1.00
From co-workers	0.004		< 0.0001		< 0.0001		< 0.0001	
Low		1.25 (0.96–1.61)		2.03 (1.39–2.97)		1.98 (1.50–2.61)		1.87 (1.44–2.42)
Intermediate		1.38 (1.12–1.71)		2.00 (1.45–2.75)		1.52 (1.20–1.93)		1.59 (1.27–2.00)
High		1.00		1.00		1.00		1.00
In private life	0.009		0.063		< 0.0001		< 0.0001	
Low		1.27 (1.06–1.52)		1.51 (1.07–2.14)		1.49 (1.22–1.81)		2.25 (1.80–2.83)
Intermediate		1.02 (0.85–1.22)		1.37 (0.98–1.92)		1.08 (0.87–1.33)		1.44 (1.16–1.77)
High		1.00		1.00		1.00		1.00

Illnesses and support at baseline without covariates.

Table 21. Odds ratios (OR) and 95% confidence intervals (CI) for disability pensions according to the level and source of social support (Study IV).

Social support	Model 1 ^a OR (95% CI)	Model 2 ^b OR (95% CI)	Model 3 ^c OR (95% CI)	Model 4a ^d OR (95% CI)	Model 5a ^e OR (95% CI)	Model 6a ^f OR (95% CI)	Model 4b ^g OR (95% CI)	Model 5b ^h OR (95% CI)	Model 6b ⁱ OR (95% CI)
From supervisor	p = 0.057								
Low	1.44 (1.03-2.01)	p = 0.003 1.72 (1.24-2.40)	p = 0.005 1.70 (1.21-2.38)	p = 0.020 1.55 (1.10-2.19)	p = 0.020 1.56 (1.09-2.24)	p = 0.039 1.49 (1.05-2.11)	p = 0.131 1.29 (0.91-1.83)	p = 0.125 1.27 (0.88-1.83)	p = 0.186 1.25 (0.88-1.78)
Interm. ^j	0.86 (0.57-1.31)	0.92 (0.59-1.44)	0.91 (0.58-1.42)	0.86 (0.55-1.34)	0.83 (0.53-1.30)	0.86 (0.54-1.37)	0.77 (0.49-1.21)	0.74 (0.46-1.18)	0.78 (0.49-1.24)
High	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
From co-workers	p = 0.142								
Low	1.56 (1.01-2.49)	p = 0.288 1.38 (0.87-2.18)	p = 0.350 1.35 (0.86-2.14)	p = 0.585 1.27 (0.79-2.05)	p = 0.630 1.26 (0.76-2.10)	p = 0.648 1.19 (0.76-1.87)	p = 0.899 1.12 (0.69-1.80)	p = 0.931 1.10 (0.66-1.83)	p = 0.932 1.06 (0.67-1.67)
Interm. ^j	1.22 (0.81-1.85)	1.20 (0.81-1.78)	1.20 (0.81-1.78)	1.08 (0.72-1.63)	1.09 (0.73-1.64)	1.12 (0.76-1.66)	1.02 (0.67-1.57)	1.00 (0.65-1.53)	1.07 (0.71-1.61)
High	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In private life	p<0.0001								
Low	1.94 (1.35-2.78)	p = 0.187 1.24 (0.88-1.75)	p = 0.169 1.20 (0.85-1.71)	p = 0.228 1.25 (0.88-1.78)	p = 0.219 1.25 (0.87-1.81)	p = 0.413 1.14 (0.80-1.61)	p = 0.317 1.13 (0.79-1.62)	p = 0.250 1.12 (0.77-1.65)	p = 0.442 1.05 (0.74-1.51)
Interm. ^j	1.11 (0.76-1.60)	0.93 (0.65-1.32)	0.92 (0.64-1.32)	0.97 (0.67-1.40)	0.95 (0.66-1.37)	0.91 (0.64-1.31)	0.88 (0.60-1.29)	0.85 (0.58-1.25)	0.85 (0.59-1.25)
High	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

^a Model 1: Without covariates.

^b Model 2: Adjusted for sociodemographic variables (age, gender, marital status, and occupational grade).

^c Model 3: Adjusted for sociodemographic and health behaviour variables (physical activity, BMI, alcohol consumption, and smoking).

^d Model 4a: Adjusted for sociodemographic and health behaviour variables, and physical illnesses.

^e Model 5a: Adjusted for sociodemographic and health behaviour variables, and mental disorders.

^f Model 6a: Adjusted for sociodemographic and health behaviour variables, and sleeping difficulties.

^g Model 4b: Adjusted for sociodemographic and health behaviour variables, physical illnesses and perceived health.

^h Model 5b: Adjusted for sociodemographic and health behaviour variables, mental disorders, and perceived health.

ⁱ Model 6b: Adjusted for sociodemographic and health behaviour variables, sleeping difficulties, and perceived health.

^j Intermediate.

5 DISCUSSION

5.1 Synopsis of the main findings

Mental disorders and sleeping problems cause human suffering, but also remarkable societal cost. Sickneses, in common, add forthcoming societal expense via medication and decrease of work ability. In this population-based sample of the Finnish working population, aged 30 years or over, an association was found between low social support both at work and in private life and diagnosed depressive and anxiety disorders. A poor team climate at work was associated with depressive disorders, but not with anxiety disorders after adjustment for all covariates or alcohol use disorders. There were also associations between the level of social support at work and in private life and various forms of sleeping problems.

Low social support at work but not in private life, and poor team climate were, in a prospective longitudian setting, associated with antidepressant medication. Low social support from a supervisor was predictive of disability pension during the subsequent 6 years, but the association was mediated by perceived non-optimal health at baseline. Disability pension was not predicted by low social support from co-workers or in private life after the socio-demographic characteristics of the participants were taken into account.

This study suggests that social relations at work seem to have a remarkable impact on employees' health and thus also on societal expense. In modern worklife, constant rushing, management by results, and continuous alterations at work are experienced as encumbering and may also result in a decreasing of social support and the deterioration of team climate.

5.2 Social factors at work associated with mental disorders

Mental health relates closely to the welfare of individuals. Good mental health enables the ability to be happy and to enjoy self-respect and autonomy, as well as the ability to care about oneself and others. Mental health means, according to Sigmund Freud, the ability to love and work (Freud 1940). Many factors already since childhood influence mental health, but mental health problems are also found in context to societal, financial, and social problems. The significance of work and the work community has widely been studied as a derivation of these disorders. There have always been mental disorders among employees, but the changes in working life have complicated the management of depressive, distressed or tired persons. Employees are required to be permanently learning, adapting to changes, managing a large amount of complexities, as well as to have the ability to interact and have tolerance for insecurity and conflicts (Nordenfelt 2008). Even milder mental disorders may be detrimental to coping with work. Depression, anxiety, and sleeping problems may impair concentration, attention, learning, and memory as well as aggravate decision-making, delay psychomotor performance and deter one from assessing one's own performance positively.

It has been suggested that depression is mostly associated with loss and deprivation, while anxiety is more likely to result from experiences of threat or danger (Warr 1990). In the present study, women were diagnosed more commonly than men as having depressive or anxiety disorders, while men were over-represented with regard to alcohol use disorders. This is in line with earlier results (e.g. Kessler et al. 1994). Women have been found to have a higher prevalence of most affective disorders and non-affective psychosis, and men to have higher rates of substance use disorders. Psychiatric co-morbidities are also a usual finding (Pirkola et al. 2005). In the present data, 70 participants had more than one mental disorder (depressive, anxiety or alcohol use disorder). The number of participants with co-morbidities was not large enough to allow for statistical analyses.

Alcohol causes burdens of sicknesses, disability, and deaths. Earlier findings on the association between the psychosocial work environment and alcohol use have been mixed. The effort-reward imbalance at work among men, and low decision latitude among women, have been related to alcohol dependence (Head et al. 2004), while job-related burnout has been associated with alcohol dependence in both sexes (Ahola et al. 2006). Low procedural justice at work has been shown to be weakly associated with an increased likelihood of heavy drinking (Kouvonen et al. 2008), unlike other stressful work conditions, which have shown no association with problematic alcohol use (Kouvonen et al. 2005). In the present study, no evidence was found of an association between poor team climate at work and alcohol use disorders (Study II). Alcohol use disorders can be influenced by personality factors, general socio-economic conditions and psychosocial factors not related to the work environment (Kendler et al. 2003).

Work is a positive proposition and employees are, in general, healthier and more satisfied with their lives than working age individuals outside working life (Honkonen et al. 2007). Work gives sense and structure to life and strengthens self-respect. Apart from the positive things in working life, there may also be encumbering factors at work. Demands in working life for employees have changed. Efficacy and competitiveness often dictate the conditions of working life and insecurity and competition increase between individuals and between companies. Employees are required to adapt to competition and continuous changes in organisation, responsibilities, and information technology. While the amount of the working population decreases, there is a demand for rationalisation and efficiency. Excessive work leaves no time for social relations and because of lack of time, also the possibility to support co-workers decreases. A continuous need to rush at work may also deteriorate the team climate.

5.2.1 Social support and mental disorders

In the present study, social support at work was related to employees' mental health, sleep problems, psychotropic medication, and even disability pensions. Social support has many aspects such as emotional, appreciative, informational and material support or aid. Getting social support may diminish the perceived work-load (Marcelissen et

al. 1988), or act as a buffer between work stress and the disadvantageous consequences on an employee's health (House et al. 1988b; Buunk 1990). Some studies on stress reduction suggest that social support may act as a critical factor between psychosocial stressors and severe health impairment (House et al. 1988b; Theorell 1999). Social support may also influence health attitudes and health behaviours directly (Ganster et al. 1986). Social support has a large effect on the quality of life and self-actualisation, and an impact on physical symptoms and responses, coping behaviour, role burden, health promoting behaviour, which may be the mechanisms through which social support affects health (Stansfeld 2006). Social support operates at both an individual and societal level. Social integration also has a positive effect on the work community. The existence of mutual trust and respect between members of a work community contributes to the way in which employees and their health are cherished (Stansfeld 2006).

Most earlier studies have employed non-clinical measures of mental health (e.g. Stansfeld et al. 2008; Malinauskiene et al. 2009). Symptom-based measures may succeed in finding disorders but often manifest only a short-term mood state. There are only few studies on social support at work using appropriate psychiatric case finding methods, such as the standardised psychiatric interview techniques like CIDI used in this study (Blackmore et al. 2007; Virtanen et al. 2008) or another valid measure (Waldenström et al. 2008) when assessing mental health. In these studies, an association has also been found between social support at work and depressive and/or anxiety disorders. Population-based studies measuring support at work both from supervisors and co-workers, and in addition support in private life, are scarce (Virtanen et al. 2008).

There were some interactions between gender and social support in the present study. A significant interaction between gender and social support from co-workers on mental health was found (Study I). Low support from co-workers had a strong association with depressive and anxiety disorders especially in men. Earlier, the effect of daily emotional support on men's mental health was found in the Dutch NEMESIS study (Plaisier et al. 2007). Furthermore, in the present study some interactions between gender and social support associated with sleep outcomes were found. In line with a Swedish study (Nordin et al. 2005), an association between sleeping difficulties within the previous month and social support in private life was found among women but not among men. In the present study, there was also an association between low support from co-workers and short sleep duration only among women.

The importance of social support from co-workers at work in men may reflect the importance of the work role for men's mental health (Plaisier et al. 2008). Men and women have been found to be vulnerable to partly different psychosocial characteristics in their work and domestic environments (Väänänen 2005). It has, for example, been suggested that private life events, in general, may affect women's health more, whereas work factors are relevant to men's health (Suominen et al. 2007). This parallels the results of the present study concerning the associations between social support in private life and sleeping problems among women. However, social support at work

seems to be equally associated with sleeping problems irrespective of gender. It seems that nowadays work is an increasingly important part of life also for women, and work stress may be manifested in sleeping problems also among women.

Several studies on stress reduction theory suggest that social support acts as a critical factor between psychosocial stressors and health impairment (House et al. 1988a; Theorell, 1999). On the other hand, some reviews suggest genuine buffering effects to be seldom observed and that different sources of social support might moderate the effects of stress on health in different manners (Buunk 1990; Loscocco and Spitze 1990; Sanne et al. 2005; Plaisier et al. 2007). The main effect of social support refers to that which directly benefits well-being by fulfilling basic social needs and social integration. The buffering effect refers to support that protects individuals from the potentially harmful influences of acutely stressful events and enhances their coping abilities. However, due to a relatively small number of cases, the buffering hypothesis was not tested in the present study.

Social support may reduce encumbering, but it may also reduce the occurrence of burden factors and so influence health both directly and indirectly. The burden factor may be detrimental to health and, in addition, may decrease social support and thereby weaken the impact of support. While social support may decrease encumbering it may at the same time bring new stress factors, such as expectations of reciprocity, debt of gratitude or conflicts in relationships which, in turn, may encumber health (Plaisier et al. 2007).

In supervisory duties support and justice are important. A thoughtful supervisor is not commanding and controlling, but stimulating and empowering. Employees working under them want to do their jobs well. Getting social support, both from the supervisor and from co-workers, is a message to the employee that he or she is an esteemed and valuable person. Aid and informational support at work may be very valuable, but emotional support expressing esteem is important especially for employees' mental health and welfare.

5.2.2 Work team climate and mental disorders

A good team climate is an important factor at work, influencing both comfort and productivity. In the present study, poor team climate was associated with depressive disorders. Poor team climate was also related to anxiety disorders, but this association attenuated in the final adjustments. Poor team climate was not related to alcohol use disorders. A good work community and a job with suitable challenges also motivate employees to commit themselves to their work, to improve their performance, and probably to increase their willingness to continue in working life longer. The supervisor is responsible for the general workplace ambience, but each employee contributes personally to the team climate.

There are only few previous reports on mental health and team climate at work. The earlier results of the mostly cross-sectional studies have been ambiguous. In one study, good climate was related to a lower probability of mental distress (Revicki and May 1989), and in another, poor climate was associated with psychological distress symptoms (Pirainen et al. 2003). In one prospective study among nurses, social climate in the work unit did not predict psychological distress at follow-up (Eriksen et al. 2006). In another study, poor team climate predicted self-reported physician-diagnosed depression among a sample of hospital employees (Ylipaavalniemi et al. 2005). Only one of the earlier studies was population-based (Pirainen et al. 2003), but in that study the assessment of depression and psychological distress relied on self-reported symptoms.

It is axiomatic that employees are more satisfied in work places with good team climate and high social support but it is important to know that team climate and social support at work are also associated with employees' health. Employees can perceive their work community as unstable if the rules keep changing all the time.

5.3 Social factors at work associated with sleeping problems

Tiredness and other symptoms of poor sleep are common problems among the working population. These symptoms also have an influence on the performance at work (Kronholm et al. 2009). When knowledge and efficacy are sufficient and work is done in a secure environment, it is possible to attain work flow and to flourish. Sleep deprivation, a common consequence of a sleep disturbance, may lead to impairment of neurobehavioural functioning similar to those seen in 1‰ drunkenness and even increased morbidity and mortality. In the present study, four different indicators of sleeping problems were used; three of them were self-reported using cross-sectional design, and one, the use of hypnotics and sedatives, was a register-based indicator using a longitudinal design. Sleeping problems cover a collection of symptoms with a variety of aetiological and background factors. Even the same symptoms may have different aetiology in different persons (Partonen and Lauerma 2007).

In working life, uncertainty, competitiveness, and demands of intensifying productivity might make it difficult for people with sleep deprivation to cope with work. In the present study, low support from separate sources in the adjusted models was associated with different kinds of sleeping problems. Low social support from a supervisor was associated with self-reported daytime tiredness and sleeping difficulties within the previous month. Low support from co-workers was also associated with daytime tiredness and sleeping difficulties within the previous month and, in addition, with short sleep duration in women. Low private life support was associated with short sleep duration, and in women, with sleeping difficulties within the previous month.

In the present study, low support from both supervisors and co-workers was associated with daytime tiredness. Tiredness is a general symptom, which may be related

to various psychiatric and somatic illnesses, as well as to work stress and work-related exhaustion. According to the Job Strain Model by Karasek and Theorell, lack of social support is one factor among working conditions causing psychosocial stress and ill health (Karasek and Theorell 1990). The concept of tiredness has been considered to include from three to five dimensions: general, mental, and physical tiredness and sleepiness, and sometimes lack of motivation or activity (Åkerstedt et al. 2004). In the present study, daytime tiredness was queried by only one question, and participants might have interpreted it as one or more various aspects when assessing their own tiredness. On the other hand, accumulating lack of sleep has been shown to weaken work motivation, knowledge processing functions in the brain, task management and vigilance at work, and to cause accidents at work (Sallinen et al. 2004). However, tiredness in turn, might also cause stress at work. Tiredness is a particular element of danger for persons whose duties and other tasks require a high level of alertness. The association between private life support and daytime tiredness failed to reach significance after adjustments.

A probable mediator of the effects of social relations at work on sleep and tiredness is thought to be the individual inability to free oneself of the distressing thoughts of work problems during leisure time (Åkerstedt et al. 2002). Work-related stress-factors, such as high demands, low job control, and high workload, have been shown to have an association with the need for recovery, and recovery, in turn, is related to tiredness and sleep quality (Sonnentag and Zijlstra 2006). Similarly, low social support and poor team climate, as stress factors, may adversely affect recovery and further increase tiredness and sleeping problems. Worries at bedtime or being awakened during the night because of anticipated potential negative feelings experienced in social relationships the next day will affect sleep quality negatively (Åkerstedt et al. 2002). Lack of social support at work may also mean lack of “buffering” resources against work stress, ie, the combination of high job demands and low job control (Karasek 1979). When insomnia becomes chronic it becomes a stress factor itself, because it cannot be easily controlled.

In the present study, an association between low support from supervisors and co-workers and sleeping difficulties within the previous month was found. However, low private life support was associated with these sleeping difficulties only among women. In Finland and in Sweden, work-related sleeping problems increased during the 1990s (Third European survey ... 2001). There are perhaps many reasons for this increase in Scandinavia. Shift work has increased and other atypical working hours are also more frequent in Scandinavia than in other parts of Europe (SALTSA 2003). Finnish and Swedish employees tend to be quite thorough and may therefore perceive their jobs as more stressful. Scandinavian drinking habits may also be related to increased rates of episodic insomnia.

Low support from co-workers among women and low support in private life were associated with short sleep duration. There was also an association between low support from supervisors and short sleep duration, but the association failed to reach

significance with further adjustment. There was also a negative association between intermediate supervisor support and long sleep duration. The explanation for this negative association is perhaps the low number of persons who reported intermediate support and long sleep duration. There were 175 persons getting high support from their supervisor and having long sleep duration, but only 21 such persons in the group of intermediate support. The only association between social support and extra long sleep duration was found concerning the support from co-workers among men before adjustment for covariates. Persons with short sleep duration are a heterogeneous group, also including those who get by on little sleep by nature (Partonen and Lauerma 2007). Low social support in private life was not related to long sleep duration. Sleep deprivation strongly influences mood, cognitive function, and motor performance (Kronholm et al. 2009). Extended sleep is also a common symptom in depression (Sbarra and Allen 2009). However, self-reported sleep duration may also reflect more time spent in bed than actual sleeping time.

In the present study, the primary models were adjusted for many potential confounding and mediating factors such as lifestyle. Coffee drinking may be a compensation for tiredness or it may cause a person to stay awake. Smoking and alcohol consumption may worsen sleep quality or sleeping difficulties may cause a person to smoke more or consume more alcohol. Many factors that affect sleep quality, i.e., overweight, physical inactivity during leisure time, small children in the household, shift work, and perceived non-optimal health, may also be related to work stress.

Working life is characterised by ongoing changes and obligations for continuous learning. Sleeping problems might complicate learning and acclimatisation to changes. Continuous insomnia may result in large-scale consumption of health care services and risk of developing depressive, anxiety, and alcohol use disorders (Partonen and Lauerma 2007). Insomnia is also a common sign in depression (Becker 2006). Poor sleep doubles the risk for later life dissatisfaction (Paunio et al. 2009). In line with the present findings, earlier studies show that people who are satisfied with their work tend to have less sleeping problems than those who are dissatisfied (Kuppermann et al. 1995). In sum, it seems that low social support at work is more detrimental to sleep than low private life support in the working population.

5.4 Social factors at work from a societal aspect

5.4.1 *Use of antidepressants and hypnotics or sedatives*

The use of both antidepressants and hypnotics has continuously increased. The growth of medication consumption has been suggested to be influenced by many factors. Firstly, at present, there is more knowledge than earlier to diagnose mental disorders and sleep problems. Secondly, compliance with psychotropic drugs has become better as mental disorders have become more ordinary and acceptable diagnoses. Medication is also more effective and inexpensive than earlier and adverse effects are less common and less disturbing than earlier. In the present study, the use of antidepressants and

hypnotics were indirect measures of mental health problems and sleep difficulties and also represent a societal aspect, as expressed by medication use, because medication causes significant expense to society. Antidepressant prescriptions may be considered as an indicator of psychiatric disorder requiring pharmacological treatment. According to clinical practice guidelines on managing depression, treatment with antidepressant medication is recommended in depressive disorders with at least significant severity (Finnish Psychiatric Association 2004). Antidepressant use, however, can only be used as a proxy of depression and sometimes other mental disorders requiring pharmacological treatment such as anxiety disorders. In the present study, both low social support at work and poor team climate were associated with antidepressant use. Low social support from the supervisor was also associated with the use of hypnotics or sedatives, but the association attenuated when lastly adjusted for the use of these drugs at baseline. Low social support or poor team climate may cause depression or anxiety, which eventually leads to the need for medication.

In the present study, data on antidepressant prescriptions covered a 3-year follow-up period and adjustments were made for baseline mental disorders and mental disorder history. Therefore, the study design can be considered as prospective. Register data on prescriptions were based on appointments for physicians and covered virtually all prescriptions for the cohort. Treatment practices may vary between physicians and affect the prescriptions, but such variability is likely to be random in relation to social support or team climate.

The use of antidepressants is more likely an underestimation than overestimation of significant depressive and anxiety disorders. The measurement of past doctor-diagnosed mental disorders is likely to exclude individuals who had not sought help for their mental health problems from a physician or got other treatment than medication. Persons with unrecognised or undertreated disorders or those treated with non-pharmacological methods are not found by this measure. The antidepressant medication may indicate the onset of a new depressive or anxiety disorder or a relapse in these disorders requiring medical treatment due to low social support or a prolonged negative work atmosphere. The use of antidepressants against pain is also important to take into account.

In the present study, the measurement of hypnotics or sedatives prescriptions was also based on register data. This measurement is likely to be an underestimation of the actual prevalence of sleep disorders, because only some people with sleep disorders use pharmaceutical treatment, and those who use them do not always obtain a refund for a minor use of hypnotics or sedatives. It is recommended to prescribe these drugs only for temporary use, i.e., less than 2 weeks (Partonen and Lauerma 2007). A prescription of hypnotics or sedatives for long-term use, i.e., more than 4 weeks, is not recommended, because the medication might decrease the functional ability of the patient, lead to tolerance of the medication, and cause addiction. Long-term use of these drugs might also cause insomnia.

In the present study, 143 participants (4%) had received a refund for part of the costs of prescribed hypnotics or sedatives during the 3-year follow-up period. There was an association between low supervisor support and subsequent consumption of sleeping medicine, but the significance attenuated after adjustment for hypnotics and sedatives use at baseline. This implies that social support and use of hypnotics and sedatives are related, but the causal connection between them cannot be absolutely determined. In any case, data on antidepressant and hypnotics or sedatives prescriptions in a longitudinal setting offered an opportunity to avoid reporting bias, since the medication was based on physicians' prescriptions.

5.4.2 *Work disability*

Health and functional capacity have improved among Finnish employees during the last decades. However, the prevalence of mental disorders seems to have been quite stable (Pirkola et al. 2005), but mental disorders as main diagnoses among disability pension recipients have increased. In 2008, 38% of the disability pension recipients had a mental disorder as the main diagnosis, while in 1996 the proportion was 27% (Statistical Yearbook of the Social ... 1997; Statistical Yearbook of the Social ... 2008). Disability pension is granted for medical reasons, while work disability does not usually occur as a result of a disease, but rather as a result of psychosocial and environmental factors (Loisel 2009). The legislation contains provisions concerning the decline of work ability entitling a person to disability pension. Among other things, the magnitude of earned pension also has a remarkable influence on an employee's willingness to leave the work life.

In the present study, low social support from the supervisor was associated with future disability pensions. Earlier, weak associations between low general support and disability pension have been found in some studies (Brage et al. 2007; Labriola and Lund 2007), or only among women (Albertsen et al. 2007), while low social support at work has not been found to relate to disability pensions (Krause et al. 1997). According to the present study, perceived health, rather than somatic or mental disease status at baseline, seemed to predict disability pension. There was a large reduction in the odds ratios between supervisor social support and disability pension after adjustment for perceived health status. Perceived health status may be a proxy for an individual's own experience of his/her working capacity, which, in turn, is a strong predictor of disability pension over and above the specific diagnosis or illness (Vuorisalmi et al. 2006; Gould et al. 2008; Sell 2009). The results suggest that the effect of social support from the supervisor on future disability pension is mediated by the employee's perception of his or her health status. Thus, lack of support from the supervisor may adversely affect the employee's perceived health, which, in turn, leads to work disability. This means that a poor relationship with a supervisor is a part of the process whereby poor experience of health contributes to future work disability. Low social support may also adversely affect psychosocial recovery, which has been found to have an effect on perceived health (Sonnentag and Zijlstra 2006). On the other hand,

baseline association between perceived non-optimal health and social support may reflect reversed causality; perceived non-optimal health may change the employee's behaviour and lead to decreasing social support or make employees evaluate social support as being low. Because the baseline assessment was cross-sectional it was not possible to test the direction of causality in this association. Perceived health has been shown to improve remarkably during the first year after retirement among persons who perceived their work communities as poor and to stay quite stable during the years thereafter (Westerlund et al. 2009).

Depression has been found to be a very important single factor leading to disability pension. Depressed persons retire on a disability pension on average 1.5 years earlier than those without depression (Karpansalo et al. 2005). In the present study, mental health at baseline was controlled, but the association between social support and work disability persisted after adjustment for baseline mental health. Insomnia is associated with significant health problems, morbidity and work absenteeism in many studies (Godet-Cayre et al. 2006; Leger et al. 2006; Daley et al. 2009). In the present study, there was an association between social support and disability pensions in the model adjusted with socio-demographic, health behaviour variables, and sleeping problems, thus suggesting that sleeping problems are not a major confounder or mediator between social support and disability pension. There were adjustments for physical and mental health, for smoking, exercise and alcohol consumption, and for perceived health. There might, perhaps, be a slight possibility of overadjustment for health.

This study indicates that important prerequisites for continuing a career are good health and a comfortable work community. A good work community may generate work flow, whereas a poor work community may cause exhaustion and elicit the compulsion to get out of the stressful community. Justice, social support, and good team climate increase comfort. Work satisfaction is, in common, influenced decisively by the quality of supervisor action, reciprocal support and assistance, as well as common team climate. Although supervisors have significant importance for the work community, every employee has the responsibility for their own welfare, for the creation of a good team climate, and for their behaviour towards others.

5.5 Evaluation of the study

5.5.1 *Common evaluation*

Social support at work was associated with depressive and anxiety disorders, some sleeping problems, and disability pension, as well as with antidepressant and hypnotics and sedatives use: team climate was associated with depressive and anxiety disorders and antidepressant use, but not with alcohol use disorders. Health behaviours (physical activity during leisure time, body mass index, alcohol consumption, smoking, or daily drinking of coffee or tea) seemed to not be significant pathways between social support and mental disorders, sleeping problems, antidepressants or hypnotics and sedatives use, or disability pension, because they did not remarkably attenuate the odds ratios

between social factors at work and outcomes. However, perceived health seemed to be a mediator in the pathway between social support and work disability. There might be some physiological or biological pathways not measured in this study affecting the outcomes, and also motivation influencing the willingness to continue working but not measured in this study. More studies are needed to evaluate the other pathways.

Some gender differences were found. Social support from co-workers seemed to be more important for the mental health of men and for sleep deprivation among women. Low private life support was associated with sleeping difficulties within the last month only among women, but not among men. No statistically significant interaction effect between gender and team climate was found regarding mental disorders or medication use, or between gender and social support regarding disability pensions.

5.5.2 Assessment of social support

Availability of social support was measured with self-assessment scales. The measure of social support at work was from the Job Content Questionnaire by R. Karasek (Karasek et al. 1998), and support in private life from the Social Support Questionnaire by I. G. Sarason (Sarason et al. 1983). Both questionnaires have been shown to be valid and reliable instruments to assess social support (Kawakami 1996; Niedhammer 2002; Rasle et al. 2005; Edimansyah 2006). Social support at work was measured with only two questions having to do with support from one's immediate superior and from co-workers. The form of the questions were general, thus they may capture aspects of different types of support, e.g. emotional, informational, self-appraisal, instrumental and practical support. Private life support was measured by asking which sources gave this support and with four items reflecting different ways of giving support. Employees having only one close person giving support in their private life were classified as having low support. However, it may be enough to have at least one close person giving support when health is considered. In any case, the wording of the scales of support at work and in private life differed to a certain extent, and there is a possibility that they indicated the phenomenon in a slightly different way.

5.5.3 Assessment of team climate

Team climate was measured with a self-assessment scale, which is included in the Healthy Organization Questionnaire of the Finnish Institute of Occupational Health. The team climate scale was comprised of four questions. There are also team climate inventories consisting of a larger number of questions (Kivimaki and Elovainio 1999). The short scale used has proved to be a valid measure and has been used in many studies by the Finnish Institute of Occupational Health (Lindström et al. 1997).

5.5.4 Assessment of outcomes

In the present study, mental disorders (depressive, anxiety, and alcohol use disorders) at baseline were assessed by CIDI, which is a standardised structured clinical psychiatric interview method developed by the World Health Organization. CIDI is a valid measure of DSM-IV non-psychotic disorders among primary care attendees (Jordanova et al. 2004). In a community setting, the depression module of the CIDI has been found to slightly over-estimate prevalence rates (Kurdyak and Gnam 2005). Many earlier studies have employed non-clinical measures of mental health, such as symptom scales (Rugulies et al. 2006), or self-certified sickness absences (Nielsen et al. 2006) as the outcome. As instruments for psychiatric case finding, these methods are not as valid as CIDI like standardised interviews. Data about antidepressants and about hypnotics and sedatives were taken from the National Prescription Register managed by the Social Insurance Institution of Finland. Data on medication prescriptions in a longitudinal setting offered an opportunity to avoid reporting bias, since medication was based on physicians' prescriptions. With register data it was possible to make prospective analyses of the predictors of mental health and sleep problems. The advantage of using register data, especially on antidepressant use, was its accuracy, because it covered practically all outpatient prescriptions for the cohort. Sleeping problems were assessed with four different indicators; three were self-reported using a cross-sectional design, and one, concerning the use of hypnotics and sedatives, was register-based using a longitudinal design. Disability pensions were extracted from the records of the Finnish Centre of Pensions and the Social Insurance Institution of Finland, and thus virtually no individuals were lost to follow-up.

5.5.5 Major strengths

One of the major strong points of this study is its large sample representing the entire Finnish working population of 30–64 years of age. The use of a representative sample allows careful generalisation of these findings to the Finnish workforce in this age range. The participation rate in the Health 2000 Study was high, at 87% in the interview, and 84% in the health examination. Non-participation did not have a large influence on this study, because the non-respondents were most often unemployed individuals who were not the target of this study (Heistaro 2008). Physical illnesses were assessed by a physician at a standard 30-min clinical examination, which can be considered as more reliable than an individual's self-report of physical illnesses. Furthermore, the results were controlled for a number of potential and previously known confounding and mediating factors.

5.5.6 Study limitations

Social support and team climate were measured with self-assessment scales at one point in time only. It is not always clear if the social support stage and work team climate

stay unchanged during the follow-up period. Because there was no follow-up data on psychiatric diagnoses, this study cannot eliminate the possibility that the association between social support at work and mental disorders, as well as that between team climate and mental disorders, reflects reversed causality, i.e., employees with mental disorders received or recognised less support or perceived team climate as poorer. Thus, the association between a mental disorder and perceived psychosocial factor at work may actually reflect the association between a disorder and its symptoms. It is also possible that employees with sleeping problems perceived the received support as weaker than their better sleeping co-workers, they may need more social support than their co-workers, and therefore think it is insufficient, or their own behaviour may have been the reason for getting less support. In the disability pension study, a baseline association between poor perceived health and social support may also reflect reverse causality; poor perceived health may change employees' behaviour and lead to decreasing social support or make employees evaluate social support as weak.

The measure of antidepressant medication as an indicator of depressive or anxiety disorders is likely to be an underestimation of the actual prevalence of these disorders. It is estimated that only one quarter of individuals identified as having a depressive or anxiety disorder receive pharmacological treatment for their mental health problems (Ohayon and Schatzberg 2002; Ohayon 2007; Hämäläinen et al. 2009). As well, the measure of hypnotics and sedatives as an indicator of sleeping difficulties may also be an underestimation of the actual prevalence of insomnia and sleeping problems. Because sleeping medicines are quite affordable and the amounts of medicine in one prescription are usually quite small, the use may not always reach the level to receive a refund. Therefore, it is possible that the sleeping medicine outcome used in this study reflects quite an excessive use.

The oldest participants in the disability pension study had a shorter follow-up time than 6 years, but the results were similar among persons aged less than 60 years. Disability pensions are rare events and the granting processes are long. In Finland, disability pensions are usually preceded by a sickness absence benefit for 300 days. During the 6-year follow-up of the present study, the 257 cases of disability pensions granted covered 7.5% of the sample. A longer follow-up time would have increased the number of pensions, but in such a time the baseline social support situation could also have changed and the association diluted. However, the present prospective design established a clear temporal relationship between the predictors and the outcome necessary for a causal interpretation.

The gathering of the sample for this study was carried out between August 2000 and March 2001. In the studies about the social support and team climate related to mental health (I and II), 20 of the 498 participants who were interviewed at the beginning of 2001 had also purchased antidepressants during 2001, which may have caused some overlapping between the exposure and the outcome. However, excluding these 498 participants resulted in findings similar to the original analysis, which suggests that

there was no such bias in this study. In the use of hypnotics and sedatives there was perhaps some overlapping of this kind as well.

Factors from non-work areas may contribute to mental disorders, sleeping problems, and even the willingness to seek a disability pension. In the present study, marital status and social support in private life were the factors most clearly related to non-work life. Unfortunately, data on negative stressful life events, an important factor, were not available.

5.6 Conclusions and policy implications

5.6.1 *Conclusions*

The present findings concerning the Finnish working population suggest that social support and team climate at work are strongly related to ill health in terms of mental disorders, sleep problems, psychopharmacological medication use, and work disability pension. Attention should be paid to these social relations at work before they lead to deteriorated health. At the same time, the results of the present study suggest that good social relations at work may also be potential resources for health.

Social relations are very important factors affecting also work motivation and sense of esteem. In contrast, poor team climate and lack of social support generate negative emotions and attitudes towards work. During the past ten years, the cost of both disability pensions and sickness absences due to mental disorders has increased 1.5-fold. It is obvious that negative social factors at work may increase especially the disability due to mental disorders. On the other hand, mental illnesses also have an impact on physical diseases. While mental disorders and disability pensions inflict substantial costs, it is important to pay attention to interventions to improve social relations at work.

In the present study, low social support both at work and in private life was associated with many sleep problems. Sleep problems and sleep duration are associated with health. Many studies suggest that both long and short sleep duration is deleterious to health. In the present study, short sleep duration was more common among men and long sleep duration among women. It is important to remember that persons with short sleep duration are a heterogeneous group that includes those who are naturally able to get by on little sleep. It is also important to find out whether the deviation of normal sleep duration is the reason for ill-health or its symptom. Sleep may be considered as a health indicator as well as a factor of life style. This means that it is also important to seek to influence sleep behaviour where appropriate.

5.6.2 Implications for future research

Men and women have been found to be vulnerable to partly different psychosocial characteristics in their work and domestic environments. It has, for example, been suggested that private life events in general may affect women's health, whereas work factors are more relevant to men's health. In the present study, some results give tangential support for this suggestion. These gender differences among men and women demonstrate that more studies on the impact of the sources of social support are needed. Work has earlier, perhaps, been more important for men than women, but nowadays, work is often a very important part of life also for women.

The present study on team climate covered only mental disorders and antidepressant use. Studies on team climate and sleeping problems, as well as team climate and disability pensions, are needed. The present study examined the association between social support and self-reported sleeping problems. Further studies focusing on sleep disorders assessed with DSM-IV diagnoses and on social support and alcohol use disorders are needed. In the present study, the only outcomes achieved with the prospective design were antidepressant and sedative drugs use, and disability pensions. Future studies should apply CIDI interview based prospective methods to predict the onset of DSM-IV mental disorders. All general disability pensions were extracted in this study, but studies on diagnosis-specific work disability are also needed.

5.6.3 Policy implications

In order to promote the health of employees and prevent an early exit from the labour market, social relations at work should be assessed both in health care and at the workplace where working-age individuals are concerned. Especially in occupational health care it is important to pay attention to social support and team climate at work when assessing the psychosocial factors at work and the employees' well-being. The perceived social support and team climate can be screened quite quickly in occupational health care when work-related problems are encountered. For the promotion of health and well-being, and the early prevention of health problems, assessment of social relations at the workplace is important, for example, using workplace surveys. High social support and good team climate at work encourage employees to trust that they are loved and esteemed members of the work community. A good work community allows employees to thrive and find stimulation, maybe even to flourish. While interventions at work to increase social support and improve team climate are often quite affordable, it could be worth testing whether they increase well-being at work, intensify productivity and reduce costs for society by reducing the need for health care and improving work ability.

SUMMARY

In this dissertation, the focus was on the association of social support and team climate at work with employees' health. Employees are on an average healthier than the unemployed, but there may be factors in the work community that influence their health negatively. The significance of social support and team climate for employees' health has been studied increasingly during the past decades. It has been found that work social support decreases job strain, increases job satisfaction, and may be a kind of buffer against the stressors at work. Low social support has been found to be related, among other things, to an increase in mental health problems and cardiovascular diseases, to a risk for increase in blood pressure and heart rate, and to lower back problems, neck pain and health effects via the alteration of immunity. Poor team climate has been found to associate, among other things, with rates of sickness absences, work strain, work-related symptoms, and psychological and musculoskeletal symptoms.

In this study, a nationally representative sample of the Finnish working population aged 30 to 64 years derived from the multidisciplinary epidemiological Health 2000 Study was used. Social support at work was measured with the Job Content Questionnaire (JCQ) by R. Karasek, and support in private life with the Social Support Questionnaire by I.G. Sarason. Team climate was measured with a self-assessment scale, which is included in the Healthy Organization Questionnaire of the Finnish Institute of Occupational Health. The diagnoses of common mental disorders were based on a standardised mental health interview (the Composite International Diagnostic Interview), and physical illnesses were determined in a comprehensive clinical health examination by a research physician. The prescriptions of antidepressants and sedatives were extracted from the prescription register of the Social Insurance Institution of Finland. The disability pensions were extracted from the records of the Finnish Centre of Pensions and of the Social Insurance Institution. Gender, age, education, occupational status, marital status and children aged less than seven years in the household were recorded as socio-demographic factors. Health and health behaviour variables used were perceived health, physical activity during leisure time, body mass index, alcohol consumption, smoking, and drinking coffee or tea daily. Job-related variables included job tenure, job demands, job control, and shift work.

Low social support, both at work and in private life, was associated with the prevalence of depressive and anxiety disorders. Low social support from co-workers was significantly related to these disorders only among men. Four forms of sleep problems were examined: daytime tiredness, sleeping difficulties within the last month, sleep duration, and the use of hypnotics and sedatives. Low support was also associated with many sleep related problems: Social support at work from the supervisor and co-workers was associated with daytime tiredness and sleeping difficulties within the last month. Low co-worker support was also associated with short sleep duration among women. Low social support neither at work nor in private life was associated with long sleep duration of more than 8 hours per night. On the other hand, low support

in private life had an association with short sleep duration of less than 7 hours per night among both women and men. No association between low private life support and daytime tiredness was found. Social support in private life was associated with sleeping difficulties only among women.

Poor team climate was associated with both depressive and anxiety disorders, but after final adjustments, the association with poor team climate and anxiety disorders attenuated. No significant relation between poor team climate and alcohol abuse or alcohol dependence was found.

Low social support from a supervisor and from co-workers was also associated with subsequent antidepressant use, whereas low support in private life was not related to antidepressant use. Low social support from supervisors was associated with the use of hypnotics and sedatives during the 3-year follow-up, though the association attenuated significantly when adjusted with the baseline use of these drugs. Poor team climate also predicted antidepressant use during the 3-year follow-up.

Although disability pension is granted for medical reasons, low social support from a supervisor seemed to increase the risk for disability pension to about 70% when adjusted with socio-demographic, health behaviour, and health variables. However, the relationship was explained by poor perceived health and its association with social support.

A remarkable gender difference was noticed in the prevalence of mental disorders. Among women, the prevalence of depressive and anxiety disorders was higher, whereas among men, the prevalence of alcohol use disorders was higher. A greater proportion of women than men used antidepressants and sedatives during the 3-year follow-up. There was no difference between gender and perceived team climate. Instead, women perceived more social support both at work and in private life. Depressive and anxiety disorders were more prevalent among women.

Although employees are on average healthier and more satisfied with their lives than the unemployed, work and the work community contain factors that may both support and debilitate employees' health. Low social support and poor team climate at work may encumber employees and increase the risk of health and sleeping problems and even of work disability. Attention should be paid to social factors at work when attempts are made to improve the health of employees. It is important also to test if interventions targeted to these factors can improve productivity and well-being at work.

YHTEENVETO

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turvan tutkimuksia 115, 2011. 147 s. ISBN 978-951-669-851-2 (nid.), ISBN 978-951-669-852-9 (pdf).

Tässä tutkimuksessa tarkastellaan sosiaalisen tuen ja työilmapiirin vaikutusta työntekijöiden terveyteen. Työssä käyvät ovat keskimäärin terveempiä kuin työttömät, mutta työyhteisössä saattaa olla myös terveyteen negatiivisesti vaikuttavia tekijöitä. Sosiaalisen tuen ja työilmapiirin merkitystä työntekijöiden terveydelle on tutkittu viime vuosina enenevästi. Sosiaalisen tuen on todettu vähentävän työstressiä, lisäävän työtyytyväisyyttä ja olevan mahdollisesti suoja työn kuormitustekijöitä vastaan. Sosiaalisen tuen vähäisyyden on todettu olevan yhteydessä muun muassa mielen-terveysongelmiin, sydän- ja verisuonisairauksien lisääntymiseen, verenpaineen ja pulssin kohoamiseen, ala- ja yläselkävaivoihin sekä immunitetin huononemiseen. Työilmapiirin on todettu vaikuttavan muun muassa sairauspoissaolojen määrään, työstressiin ja työperäisten oireiden määrään. Huonon työilmapiirin on todettu lisäävän sekä psyykkisiä että tuki- ja liikuntaelinoireita.

Tässä tutkimuksessa käytettiin kansallisesti edustavaa Terveys 2000 -aineistoa 30–64-vuotiaista työssä käyvistä suomalaisista. Sosiaalista tukea työssä mitattiin Karasekin JCQ-kyselyllä (Job Content Questionnaire) ja yksityiselämän sosiaalista tukea Sarasonin kyselyllä (Social Support Questionnaire). Työilmapiiriä mitattiin kyselyllä, joka on osa Työterveyslaitoksen Terve työyhteisö -kyselyä (Healthy Organization Questionnaire). Mielenterveyshäiriöiden diagnoosit perustuivat standardoituun mielenterveyshaastatteluun (Composite International Diagnostic Interview) ja somaattisten sairauksien diagnoosit lääkärintarkastukseen. Tiedot lääkärin määräämistä masennus- ja unilääkkeistä poimittiin Kelan rekisteristä ja tiedot työkyvyttömyyseläkkeistä Eläketurvakeskuksen ja Kelan rekistereistä. Sosiodemografisina taustatekijöinä käytettiin sukupuolta, ikää, siviilisäätystä, koulutusta, ammattiasemaa ja perheen alle 7-vuotiaiden lasten määrää. Terveysten liittyvinä muuttujina käytettiin koettua terveyttä, vapaa-ajan liikuntaa, painoindeksiä, alkoholinkäyttöä, tupakointia sekä päivittäistä kahvin- ja teenjuontia. Työhön liittyvinä muuttujina käytettiin työsuhteen kestoa, työn vaatimuksia, työn hallintaa sekä vuorotyötä.

Vähäinen sosiaalinen tuki sekä työssä että yksityiselämässä oli yhteydessä masennukseen ja ahdistuneisuushäiriöihin. Työtovereilta saatu vähäinen tuki oli selkeästi yhteydessä näihin häiriöihin ainoastaan miehillä.

Tutkimuksessa tarkasteltiin neljää erilaista uneen liittyvää ongelmaa: päiväaikaista väsymystä, univaikeuksia edeltävän kuukauden aikana, unen pituutta ja unilääkkeiden käyttöä. Sosiaalisen tuen vähäisyydellä osoittautui olevan yhteys myös moniin näistä uniongelmiin. Työssä saatava vähäinen sosiaalinen tuki sekä esimieheltä että työtovereilta oli yhteydessä päiväaikaiseen väsymykseen ja edeltävän kuukauden aikana esiintyneisiin univaikeuksiin. Vähäinen tuki työtovereilta oli naisilla yhteydessä myös unen lyhyeen keston. Vähäisellä sosiaalisella tuella työssä tai yksityiselämässä

ei näyttänyt olevan yhteyttä pitkään, yli kahdeksan tunnin yöuneen. Sen sijaan yksityiselämän vähäinen tuki oli yhteydessä alle seitsemän tunnin mittaiseen yöuneen sekä miehillä että naisilla. Yksityiselämän vähäisen sosiaalisen tuen yhteyttä väsymykseen ei todettu. Yksityiselämän vähäinen sosiaalinen tuki oli yhteydessä edeltävän kuukauden aikana esiintyneisiin univaikeuksiin ainoastaan naisilla.

Huono työilmapiiri vaikutti sekä masennukseen että ahdistuneisuushäiriöihin. Kun huomioitiin kaikki sekoittavat tekijät, heikkeni yhteys ahdistuneisuushäiriöihin. Huonolla työilmapiirillä ei todettu olevan selkeää yhteyttä alkoholin väärinkäyttöön tai alkoholiriippuvuuteen.

Vähäinen tuki sekä esimiehiltä että työtovereilta oli yhteydessä myöhempään masennuslääkkeiden käyttöön kolmen vuoden seurannassa. Sen sijaan yksityiselämässä saatavalla vähäisellä tuella ei ollut selkeää yhteyttä masennuslääkkeiden käyttöön. Huono työilmapiiri ennusti masennuslääkkeiden käyttöä. Esimiehiltä saatava vähäinen tuki oli yhteydessä unilääkkeiden käyttöön, joskin yhteys selkeästi heikkeni, kun otettiin huomioon unilääkkeiden käyttö jo lähtötilanteessa.

Vaikka työkyvyttömyyseläke myönnetään lääketieteellisin perustein, näytti vähäinen sosiaalinen tuki esimieheltä lisäävän työkyvyttömyyseläkkeen todennäköisyyttä noin 70 prosentilla, kun huomioitiin sosiodemografiset sekä terveyskäyttäytymiseen ja terveyteen liittyvät tekijät. Kuitenkin vastaajan oma kokemus heikosta terveydestään ja sen yhteys sosiaalisen tuen puutteeseen näytti selittävän sosiaalisen tuen ja työkyvyttömyyseläkkeen välisen yhteyden.

Mielenterveyshäiriöiden esiintymisessä todettiin selkeä ero sukupuolten välillä. Naisilla esiintyi miehiä yleisemmin masennusta ja ahdistuneisuushäiriöitä, kun taas alkoholinkäyttöön liittyvät häiriöt olivat selkeästi yleisempiä miehillä. Naiset käyttivät miehiä yleisemmin masennuslääkkeitä. Ilmapiirin kokemisessa ei ollut merkitsevää eroa sukupuolten välillä. Naiset kokivat saavansa sosiaalista tukea enemmän sekä esimiehiltä ja työtovereilta että yksityiselämässä.

Vaikka tiedetään, että työssä käyvät ovat keskimäärin terveempiä ja tyytyväisempiä elämäänsä kuin työttömät, pitäisi työhyvinvointiin kiinnittää entistä enemmän huomiota, jotta tulevaisuudessakin yhteiskunnassamme riittää työntekijöitä. Työssä ja työyhteisössä on tekijöitä, jotka voivat sekä tukea että vahingoittaa työntekijöiden terveyttä.

Tämä tutkimus osoittaa, että vähäinen sosiaalinen tuki ja huono työilmapiiri ovat yhteydessä moniin terveysongelmiin ja lisäävät työkyvyn menettämisen riskiä. Työpaikan sosiaalisiin tekijöihin tulisi kiinnittää huomiota, kun pyritään parantamaan työntekijöiden terveyttä. Olisi tärkeää myös tutkia, voidaanko näihin tekijöihin kohdistuvilla interventioilla parantaa työhyvinvointia ja tuottavuutta.

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Research report

The association of social support at work and in private life with mental health and antidepressant use: The Health 2000 Study

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Abstract

Background: Social support is assumed to protect mental health, but it is not known whether low social support at work increases the risk of common mental disorders or antidepressant medication. This study, carried out in Finland 2000–2003, examined the associations of low social support at work and in private life with DSM-IV depressive and anxiety disorders and subsequent antidepressant medication. **Methods:** Social support was measured with self-assessment scales in a cohort of 3429 employees from a population-based health survey. A 12-month prevalence of depressive or anxiety disorders was examined with the Composite International Diagnostic Interview (CIDI), which encompasses operationalized criteria for DSM-IV diagnoses and allows the estimation of DSM-IV diagnoses for major mental disorders. Purchases of antidepressants in a 3-year follow-up were collected from the nationwide pharmaceutical register of the Social Insurance Institution.

Results: Low social support at work and in private life was associated with a 12-month prevalence of depressive or anxiety disorders (adjusted odds ratio 2.02, 95% CI 1.48–2.82 for supervisory support, 1.65, 95% CI 1.05–2.59 for colleague support, and 1.62, 95% CI 1.12–2.36 for private life support). Work-related social support was also associated with subsequent antidepressant use.

Limitations: This study used a cross-sectional analysis of DSM-IV mental disorders. The use of purchases of antidepressant as an indicator of depressive and anxiety disorders can result in an underestimation of the actual mental disorders.

Conclusions: Low social support, both at work and in private life, is associated with DSM-IV mental disorders, and low social support at work is also a risk factor for mental disorders treated with antidepressant medication.

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Keywords: Antidepressants; CIDI; Mental disorders; Social support at work; Social support in private life; Population study

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1. Introduction

Mental disorders, and in particular depression, are quite common in general and working populations (Järvisalo et al., 2005; Alonso et al., 2004; Bijl et al., 1998; De Graaf et al., 2002; Ohayon and Schatzberg, 2002). In Finland, for example, the prevalence of depressive disorders is 6.4% (employees) to 11.9% (unemployed) among the working age population (Honkonen et al., 2007). Depressive disorders are one of the most significant contributors to work disability (Rytsälä et al., 2005; Murray and Lopez, 1997) and premature exit from the labour market (Kuusisto and Varisto, 2005; Gould and Nyman, 2004). Although the prevalence of mental disorders has not increased in Finland (Pirkola et al., 2005), there is an increasing trend towards sick leaves due to mental disorders and the use of antidepressants has increased 7-fold from 1990 to 2005 (Klaukka, 2006; Finnish Statistics on Medicines 2005, 2006).

Social support has been shown to associate with mental health (Bromet et al., 1992; Escriba-Aguir and Tenias-Burillo, 2004; Fujita and Kanaoka, 2003; Kawakami et al., 1992; Park et al., 2004; Plaisier et al., 2007; Stansfeld et al., 1999; Watanabe et al., 2004). Studies suggest that social support reduces job stress (Oginska-Bulik, 2005), increases job satisfaction (McCalister et al., 2006), protects against insomnia (Nakata et al., 2004, 2001) and is associated with a reduced incidence of depressive and anxiety disorders (Plaisier et al., 2007). Social support has been found to be a kind of a buffer against the stressors of the work environment (Cooper, 1998). In some studies the buffer hypotheses were refuted (Sanne et al., 2005; Ganster et al., 1986). However, social relationships can also be negative or have conflicting aspects (House et al., 1988). The problems in the atmosphere of the social environment of a work community have been shown to predict self-reported depression (Ylipaavalniemi et al., 2005) and sick leaves (Väänänen, 2005; Väänänen et al., 2004, 2003). In many studies there is evidence that low levels of social support increase the risk of mental symptoms (Stansfeld et al., 1997; Niedhammer et al., 1998; Paterniti et al., 2002; Stansfeld et al., 1999). Unfairness in leadership has been identified to be associated with the reduced mental health of employees (Elovainio et al., 2002; Kivimäki et al., 2003). Severe problems in social relationships at work, such as bullying, can increase the risk of depression (Kivimäki et al., 2003; Vartiainen, 2003).

According to several studies, women are twice as likely to suffer from depressive or anxiety disorders as

men (Alonso et al., 2004; Plaisier et al., 2007). Gender differences in social support tend to suggest that women both give and receive more support than men (Beehr et al., 2003; Fuhrer et al., 1999) but the favourable effect of support is stronger for men than for women (Fuhrer and Stansfeld, 2002; Plaisier et al., 2007; Schwarzer, 2005; Väänänen et al., 2005). One study found that women but not men with low supervisor support were at increased risk for severe depressive symptoms whereas no association was observed between support from colleagues and severe depressive symptoms in either gender (Rugulies et al., 2006). Partner or family strain more often seems to be predictive of ill-health outcomes for women (Walen and Lachman, 2000).

Reliance on self-estimation of depression and anxiety disorders in selected populations is a major limitation of most previous social support studies and for this reason it is not clear to what extent the existing evidence can be extrapolated to the general population. Using the population-based data of the nationwide Health 2000 study, we examined mental health in a cohort of employees with a standardized psychiatric interview (CIDI) and followed their recorded purchases of prescribed antidepressants during a 3-year period. To our knowledge this is the first study to compare the significance of social support at work with private life support in psychiatric disorders by using the CIDI. This is also the first study to examine whether low social support predicts antidepressant medication.

2. Methods

2.1. Study sample

The Health 2000 Study was a nationally representative population-based health study carried out in Finland 2000–2001. The two-stage stratified cluster sample comprised the Finnish population (0.24% sample) aged 30 years or over and included 8028 persons (Statistical Yearbook of Finland, 2000; Aromaa and Koskinen, 2004). The frame was regionally stratified according to the five university hospital districts, each serving about one million inhabitants and differing in several features related to health services, geography, economic structure, and the socio-demographic characteristics of the population. From each university hospital region, 16 health care districts were sampled as clusters. The 15 largest cities were all included with a probability of one and 65 other areas were sampled applying the probability proportional to population size (PPS) method. Finally, from each of these 80 areas a random sample of individuals was drawn from the National Population

Register. Details of the methodology of the project have been published elsewhere (Aromaa and Koskinen, 2004).

The participants were interviewed at home and were given a questionnaire which they returned at a clinical health examination. The respondents received an information leaflet and their written informed consent was obtained. The study was approved by the Ethics Committee of Epidemiology and Public Health in the Hospital District of Helsinki and Uusimaa. Of the original sample ($N=8028$), participation in the interview was 87% and 84% in the health examination. The non-participants were most often unemployed men or men with low income (Heistaro, 2005). Compared to participants in the CIDI interview, those who only attended the home interview were found to score more symptoms in the BDI (Beck Depression Inventory) and GHQ-12 (General Health Questionnaire) questionnaires. They were also older, more often single or widowed and had a low-grade education (Pirkola et al., 2005).

There were 5871 persons of working age (30 to 64 years) who comprised the basic population in our study. Of them 87.8% were interviewed and 84.1% returned the questionnaire. The health examination, including the CIDI, was carried out with 83.2%. The

final cohort of the present study comprised of 1695 employed men and 1734 employed women (Fig. 1).

2.2. Measurements

Availability of social support was measured with self-assessment scales. The measure of social support at work was from the Job Content Questionnaire (Karasek et al., 1998). The scale comprised two items (“When needed, my closest superior supports me” and “When needed, my fellow workers support me”). Responses were given on a 5-point scale ranging from 1 (fully agree) to 5 (fully disagree). The mean of the two questions was calculated and the scale was reversed in order to give high values for good support. For further analyses, alternatives 1 and 2 as well as 4 and 5 of the single items were combined to make 3-point scales.

The measure of social support in private life was a part of the Social Support Questionnaire by I. G. Sarason (Sarason et al., 1983, 1987). The scale comprised four items (“On whose help can you really count when you feel exhausted and need relaxation?”, “Who do you think really cares about you no matter what happened to you?”, “Who can really make you feel better when you feel down?”, and “From whom do you get practical help when needed?”) reflecting different

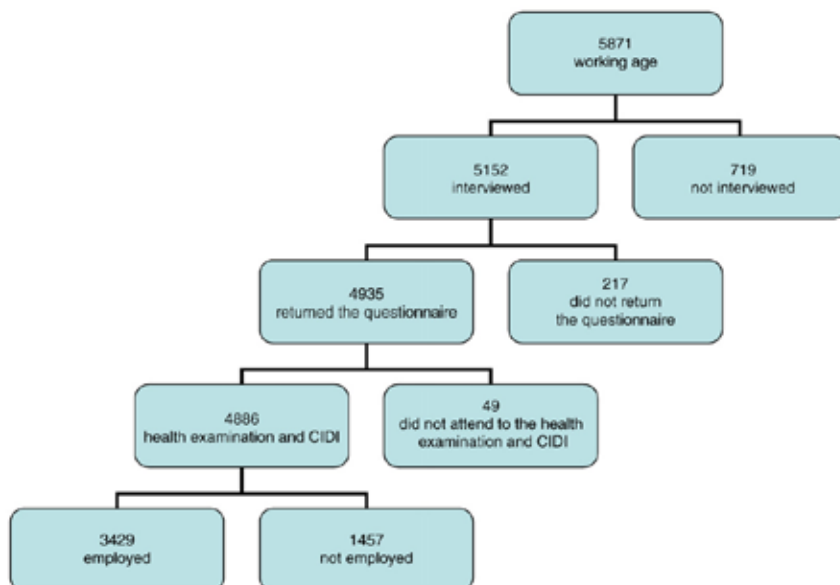


Fig. 1. The selection of the study population.

ways to give support. Respondents could choose one or more of six alternatives (husband, wife or partner, some other relative, close friend, close neighbour, someone else close, no one) giving support. The score of private life support was formed by combining the sources giving support and the items reflecting the nature of support. The score ranged from 0 to 20. For analyses the score was divided into tertiles (low 0–4, intermediate 5–8, and high 9–20). Cronbach's α was 0.71 for the private life support.

Mental health status was assessed by a computerized version of the WHO Composite International Diagnostic Interview (M-CIDI) as a part of a comprehensive health examination at baseline. The standardized CIDI interview is a structured interview developed by the World Health Organization (WHO) and designed for use by trained non-psychiatric health care professional interviewers (Wittchen et al., 1998). It has been shown to be a valid assessment measure of common mental non-psychotic disorders (Jordanova et al., 2004). The program uses operationalized criteria for DSM-IV diagnoses and allows the estimation of DSM-IV diagnoses for major mental disorders. The 21 interviewers were trained for the CIDI interview for 3–4 days by psychiatrists and physicians who had been trained by a WHO authorised trainer. Mental disorders were assessed using DSM-IV definitions and criteria. A participant was identified as a case if he/she fulfilled the criteria for a depressive or anxiety disorder. Depressive disorders included a diagnosis of depression or dysthymic disorder during the previous 12 months and anxiety disorders included diagnoses of panic disorder with or without agoraphobia, generalized anxiety disorder, social phobia NOS and agoraphobia without panic disorder.

Lifetime mental disorders were assessed by a single-item question asking whether a doctor had ever confirmed a diagnosis of mental disorder (yes/no).

Use of antidepressant medication was an indirect measure of occurrence of mental health problems. With antidepressant register data from the National Prescription Register managed by the Social Insurance Institution of Finland, we were able to make a prospective analysis of the predictors of mental health problems. National sickness insurance covers the total Finnish population and refunds part of the costs of prescribed medication for practically all patients. Each participant's personal identification number (a unique number given to all Finns at birth and used for all contacts with the social welfare and health care systems) linked the survey data to the register-based information on drug prescription. Outpatient prescription data based on the WHO's

Anatomical Therapeutic Chemical (ATC) classification code (WHO Collaborating Centre for Drug Statistics Methodology, 2004) is in the prescription register of the Social Insurance Institution. All the prescriptions coded as N06A (the ATC code for antidepressants) were extracted from January 1st, 2001 to December 31st, 2003.

Sociodemographic variables included age, gender, marital status, and occupational grade. Marital status was divided into two groups: those who were married or cohabiting and those who were divorced, widowed or single. Occupational grade was formed based on occupation and type of business: upper grade non-manual, lower grade non-manual, manual workers, and self-employed (Classification of Socioeconomic Status, 1999).

2.3. Statistical analyses

Descriptive statistics were presented for each variable and comparisons were made using the χ^2 test or Wilcoxon test. Binary logistic regression models were used to calculate adjusted odds ratios and their 95% confidence intervals for having any of the 12-month anxiety or depressive disorders, and at least one purchase of antidepressants during the 3-year follow-up. Analyses of the association of these outcomes with social support were adjusted for potential confounding and mediating factors: age, gender, marital status, occupational grade, lifetime mental disorders, and baseline mental disorders (for antidepressant use). The analyses were repeated for depressive and anxiety disorders separately. Analyses regarding social support in private life were not adjusted for marital status because marital status is closely related to getting support in private life. The associations between support in private life and indicators of mental disorders were also conducted by the source of support. Interaction effects between gender and social support predicting mental disorders and antidepressant use were also tested, because the gender effects of social support on mental health have previously been reported (Fuhrer and Stansfeld, 2002; Plaisier et al., 2007; Schwarzer, 2005; Väänänen et al., 2005). In case of significant interactions genders were analyzed separately.

Sampling parameters and weighting adjustment were used in the analyses to account for the survey design complexities, including clustering in a stratified sample, and non-participation (Lehtonen et al., 2003; Aromaa and Koskinen, 2004). The data were analysed using SAS 9.1 survey procedures and SUDAAN 9 software. SUDAAN has been specifically designed to analyse

cluster-correlated data in complex sample surveys (SUDAAN Language Manual, 2004).

3. Results

The characteristics of the study participants by gender are shown in Table 1. Women had higher occupational grade and were more likely to be divorced, widowed or single than men. A greater proportion of women than men also reported lifetime mental disorders and had a higher prevalence of 12-month mental disorders. A greater proportion of women than men had both depressive and anxiety disorders and also used

antidepressants during the follow-up-period more often. Women reported getting more social support both at work and in private life.

Table 2 presents results of the association between social support and 12-month mental disorders. Low and intermediate social support at work from both supervisors and colleagues and low social support in private life were related to a higher prevalence of mental disorders. We found one statistically significant interaction which was seen between gender and social support from colleagues ($p=0.016$). As shown in Table 3, low social support from colleagues was associated with 12-month DSM-IV depressive and anxiety disorders in men.

Table 1
Characteristics of the study population ($N=3429$).

Characteristics	Men ($N=1695$)		Women ($N=1734$)		p
	Mean (S.D.)	Number (weighted %)	Mean (S.D.)	Number (weighted %)	
Age	44.2 (8.44)		44.7 (8.38)		0.08
Occupational grade					<0.0001
Higher non-manual		456 (27)		497 (29)	
Lower non-manual		261 (15)		670 (39)	
Manual		650 (39)		370 (21)	
Self employed		320 (19)		193 (11)	
Marital status					0.003
Married/cohabiting		1361 (80)		1323 (76)	
Single, divorced or widowed		334 (20)		411 (24)	
Lifetime mental disorder ^a					<0.0001
No		1570 (93)		1536 (89)	
Yes		125 (7)		198 (11)	
Depressive or anxiety disorder during past 12 months ^b					<0.0001
No		1589 (94)		1528 (88)	
Yes		106 (6)		206 (12)	
Depressive disorder					<0.0001
No		1628 (96)		1583 (91)	
Yes		67 (4)		151 (9)	
Anxiety disorder					0.0024
No		1642 (97)		1647 (95)	
Yes		53 (3)		87 (5)	
Antidepressant use					<0.0001
No		1600 (94)		1536 (89)	
Yes		95 (6)		198 (11)	
Social support at work (1–5)	3.89 (0.97)		4.02 (0.91)		<0.0001
From supervisor					0.0008
Low		294 (18)		247 (15)	
Intermediate		273 (17)		226 (14)	
High		1072 (65)		1195 (72)	
From colleagues					0.026
Low		117 (7)		107 (6)	
Intermediate		205 (12)		162 (10)	
High		1325 (80)		1406 (84)	
Social support in private life (0–20)	6.35 (2.97)		7.40 (3.02)		<0.0001
Low		631 (38)		388 (22)	
Intermediate		695 (41)		772 (45)	
High		351 (21)		566 (33)	

^a Self-reported information on doctor-diagnosed mental disorder.

^b Diagnosis based on the CIDI interview.

Table 2
12-month prevalence of DSM-IV depressive or anxiety disorders by social support.

	Univariate		With covariates ^a	
	<i>p</i>	OR (95% CI)	<i>p</i>	OR (95% CI)
Support from supervisor	<0.0001		<0.0001	
High (<i>N</i> =2267)		1.00		1.00
Intermediate (<i>N</i> =499)		1.64 (1.19–2.26)		1.76 (1.24–2.51)
Low (<i>N</i> =541)		2.27 (1.70–3.02)		2.02 (1.48–2.82)
Support from colleagues	<0.0001		<0.0001	
High (<i>N</i> =2731)		1.00		1.00
Intermediate (<i>N</i> =367)		2.20 (1.59–3.04)		2.12 (1.48–3.04)
Low (<i>N</i> =224)		2.07 (1.41–3.05)		1.65 (1.05–2.59)
Private life support	0.010		0.04	
High (<i>N</i> =917)		1.00		1.00
Intermediate (<i>N</i> =1467)		1.38 (0.99–1.92)		1.35 (0.96–1.91)
Low (<i>N</i> =1019)		1.68 (1.20–2.35)		1.62 (1.12–2.36)

Odds ratios (OR) and 95% confidence intervals (CI).

Separate analysis for each dimension of social support.

^a Support from supervisor and from colleagues adjusted for age, gender, marital status, occupational grade and lifetime mental disorders and private life support adjusted for age, gender, occupational grade and lifetime mental disorders.

In women, only intermediate but not low support was associated with mental disorders. Separate analyses were also made for depressive and anxiety disorders. Results were similar except that some of the associations between anxiety disorders and social support were weaker (data not shown).

Table 3
12-month prevalence of DSM-IV depressive or anxiety disorders by social support from colleagues in women and men.

	<i>p</i>	OR (95% CI)
Women		
Support from colleagues	0.006	
High (<i>N</i> =1406)		1.00
Intermediate (<i>N</i> =162)		2.03 (1.31–3.14)
Low (<i>N</i> =107)		0.98 (0.51–1.88)
Men		
Support from colleagues	<0.0001	
High (<i>N</i> =1325)		1.00
Intermediate (<i>N</i> =205)		2.41 (1.31–4.44)
Low (<i>N</i> =117)		4.03 (1.94–8.34)

Odds ratios (OR) and 95% confidence intervals (CI).

Adjusted for age, marital status, occupational grade and lifetime mental disorders.

Table 4
Odds ratios (OR) and 95% confidence intervals (CI) for antidepressant use by the level and source of social support.

Social support	<i>p</i>	OR (95% CI)
Support from supervisor	0.003	
High (<i>N</i> =2267)		1.00
Intermediate (<i>N</i> =499)		0.76 (0.43–1.34)
Low (<i>N</i> =541)		1.81 (1.23–2.67)
Support from colleagues	0.008	
High (<i>N</i> =2731)		1.00
Intermediate (<i>N</i> =367)		1.63 (1.03–2.60)
Low (<i>N</i> =224)		2.02 (1.19–3.44)
Private life support	0.42	
High (<i>N</i> =917)		1.00
Intermediate (<i>N</i> =1467)		0.91 (0.62–1.33)
Low (<i>N</i> =1019)		1.19 (0.80–1.76)

Support from supervisor and from colleagues adjusted for age, gender, marital status, occupational grade, lifetime mental disorders and CIDI diagnoses at baseline and private life support adjusted for age, gender, occupational grade, lifetime mental disorders and CIDI diagnoses at baseline. Separate analysis for each dimension of social support.

The association between social support and subsequent antidepressant medication is presented in Table 4. During the follow-up period, 293 participants (8.5%) had purchased antidepressants. A gender difference was found; 11% of women and 6% of men had purchased antidepressant medication. Low support from supervisor and low support from colleagues were associated for antidepressant use while low social support in private life was not a significant predictor of antidepressant use. No interaction with gender was found in the association between social support and antidepressant use.

There were only 13 persons who had no support in their private life. This group had a 5.24-fold (95% CI 1.38–19.86) risk for DSM-IV depressive or anxiety disorders ($p=0.0025$). With covariates this model was not statistically significant ($p=0.077$), as was also the case for antidepressant use ($p=0.089$ with covariates). Regarding the source of support, only low spousal support was related to DSM-IV depressive and anxiety disorders (OR 1.86 and 95% CI 1.21–2.86) but no statistically significant associations were found between the sources of support and subsequent antidepressant medication.

4. Discussion

Evidence from a population-based cohort of 3429 Finnish men and women suggest that low social support both at work and in private life is associated with DSM-IV diagnoses of depressive or anxiety disorders. Low social support at work unlike in private life also predicted subsequent antidepressant medication. These

findings are in accordance with some earlier studies showing an association between low social support and mental health problems (Plaisier et al., 2007; Stansfeld et al., 1999; Watanabe et al., 2004). However, most research has been cross-sectional and the few published longitudinal studies have employed non-clinical measures of mental health, such as symptom scales (Rugulies et al., 2006) or self-certified sickness absences (Nielsen et al., 2006) as the outcome. Our assessment of mental health was based on the CIDI, which is a standardised structured clinical interview method (Wittchen et al., 1998). Data on antidepressant prescriptions in a longitudinal setting offered an opportunity to avoid reporting bias since medication was based on physicians' prescriptions. Antidepressant prescriptions may be considered as an indicator of psychiatric disorder requiring treatment since according to clinical practice guidelines on managing depression treatment with antidepressant medication is recommended in depressive disorders with significant disability (Finnish Psychiatric Association, 2004; National Institute for Clinical Excellence [NHS], 2004).

In our study, low social support at work from both supervisor and colleagues was associated with having a depressive or anxiety disorder diagnosis. Getting social support may diminish perceived work load (Marcelissen et al., 1988), act as a buffer between work stress and disadvantageous consequences on an employee's health (House, 1981; Buunk et al., 1989) and influence attitudes or health attitudes directly (Ganster et al., 1986). In the present study, there was a significant interaction between gender and social support from colleagues on mental health. Low support from colleagues had a strong association with depressive or anxiety disorders especially in men. Earlier, the effect of daily emotional support on men's mental health was found in the Dutch NEMESIS Study (Plaisier et al., 2007). The importance of social support from colleagues at work may reflect the importance of the work role for men's mental health (Plaisier et al., 2008). Instead, social support in private life was not significantly associated with antidepressant use in our data. Regarding work stress, it is in the long run perhaps more important to get support at work than in private life. Possibly, low social support in private life could actually reflect temperamental factors such as low extroversion and high neuroticism, whereas low work-related social support would be an indicator of deteriorating mental health. In our study private life support was measured by asking the sources giving this support. Persons who had no one to get support from may be at high risk of mental disorders. In our study there were only 13 persons having no one to get support from in private life.

Although this subgroup was small, the findings indicate a high risk of mental disorders among those who have no private life support at all. It may be enough to have at least one close person giving support when mental health is considered. Furthermore, the wording of the scales of support at work and support in private life differed to a certain extent and there is a possibility that they indicated the phenomenon in a slightly different way. These are important themes for further research.

Because we had no follow-up data on DSM-IV diagnoses, this study cannot eliminate the possibility that the association between social support at work and mental disorders reflects reversed causality, i.e. employees with mental disorders received or recognized less support. The association between a mental disorder and perceived social support may actually reflect the association between a disorder and its symptoms.

The standardized CIDI interview we used is a valid measure of DSM-IV non-psychotic disorders among primary care attendees (Jordanova et al., 2004) but it has not been validated in general populations. In a community setting, the depression module of the CIDI has been found to slightly over-estimate prevalence rates (Kurdyak and Gnam, 2005). The validity of the measure concerning lifetime mental disorder is unknown. A standardised psychiatric interview to define mental disorder has previously been used only in one study of social support (Plaisier et al., 2007) but in that study social support was assessed through scales of daily emotional support.

In the present study we considered the diagnoses of depressive and anxiety disorders and the antidepressant use as indicators of mental health. Antidepressant use, however, can only be used as a proxy of depression and sometimes also of other mental disorders requiring pharmacological treatment. Low social support may cause depression or anxiety which eventually leads to a need of medication. In our study data on antidepressant prescriptions covered a 3-year follow-up period and adjustments were made for baseline DSM-IV mental disorders and mental health history. Register data on prescriptions were based on appointments to physicians and covered virtually all prescriptions for the cohort. Treatment practices may vary between physicians and affect the prescriptions but such variability is likely to be random in relation to social support. The use of antidepressants is more likely an underestimation than overestimation of significant depressive and anxiety disorders. Our measurement of past doctor-diagnosed mental disorders is likely to exclude individuals who had not sought help for their mental health problems from a physician or got other treatment than medication. Persons with unrecognized or undertreated disorders or

those treated with non-pharmacological methods are not found by this measure. According to some studies, under 60% of people having depressive disorders have sought and received treatment and fewer than 30% have pharmacological treatment (Ohayon and Schatzberg, 2002; Ohayon, 2007). Therefore, our results may suffer from slight underestimation of mental disorders but this is unlikely to cause any major bias to the associations.

In our study women worked in higher grade occupations than men, as they tend to do in Finland, especially among younger people. A greater proportion of women than men worked in lower non-manual occupations and a greater proportion of men than women worked in manual occupations. The non-participation had no large influence in our study because the non-respondents were most often unemployed men not included in our study.

In conclusion, low social support at work from supervisor and colleagues as well as in private life was associated with DSM-IV depressive or anxiety disorders. Low social support at work also predicted subsequent antidepressant medication. Mental disorders account for a considerable proportion of the disease burden and are a major cause of work disability. To promote mental health at workplaces social support from supervisors and from colleagues should be regarded as an important resource for work. Practices for its utilization should be regarded as a target worth of priority.

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Conflict of interest

None.

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Sinokki M, Hinkka K, Ahola K et al. The association between team climate at work and mental health in the Finnish Health 2000 Study. *Occup Environ Med* 2009; 66: 523–528.

The association between team climate at work and mental health in the Finnish Health 2000 Study

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ABSTRACT

Objectives: Depression, anxiety and alcohol use disorders are common mental health problems in the working population. However, the team climate at work related to these disorders has not been studied using standardised interview methods and it is not known whether poor team climate predicts antidepressant use. This study investigated whether team climate at work was associated with DSM-IV depressive, anxiety and alcohol use disorders and subsequent antidepressant medication in a random sample of Finnish employees.

Methods: The nationally representative sample comprised 3347 employees aged 30–64 years. Team climate was measured with a self-assessment scale. Diagnoses of depressive, anxiety and alcohol use disorders were based on the Composite International Diagnostic Interview. Data on the purchase of antidepressant medication in a 3-year follow-up period were collected from a nationwide pharmaceutical register of the Social Insurance Institution.

Results: In the risk factor adjusted models, poor team climate at work was significantly associated with depressive disorders (OR 1.61, 95% CI 1.10 to 2.36) but not with alcohol use disorders. The significance of the association between team climate and anxiety disorders disappeared when the model was adjusted for job control and job demands. Poor team climate also predicted antidepressant medication (OR 1.53, 95% CI 1.02 to 2.30).

Conclusion: A poor team climate at work is associated with depressive disorders and subsequent antidepressant use.

Mental disorders, especially depression, are common in working populations^{1–3} and are associated with substantial work disability in terms of sick leave and work disability pensions.^{4,5} Although the prevalence of mental disorders has not increased,⁶ the use of antidepressants in Finland grew sevenfold from 1990 to 2005.⁷

Increasing evidence suggests that psychosocial work characteristics predict mental ill-health^{8,9}: the association between high psychological demands, low decision latitude, high job insecurity⁹ and low social support,^{9,10} and mental health problems has been reported in earlier studies. One of the rarely studied psychosocial work characteristics with regard to mental health is team climate, considered to be a construct that refers to individuals' perceptions of the quality of communication in the work environment.¹¹ Organisational culture captures the way things are done in an organisation, and climate captures the way people perceive their immediate work environment. Therefore, culture is a property of the organisation, while climate features the individuals. A number of

studies in various types of organisations link perceived climate to sickness absence rates, service quality, worker morale, staff turnover, the adoption of innovations and team effectiveness.^{12–19} Cross-sectional studies have suggested an unfavourable team and organisational climate are associated with high stress,¹⁴ work-related symptoms and elevated rates of sickness absence.^{12,20} A tense and prejudiced work climate has also been associated with a higher risk of work-related psychological and musculoskeletal symptoms and sick-leave days when compared with a relaxed and supportive climate.²⁰

We are aware of only one previous study focussing on team climate as a predictor of depression.²¹ In that study, poor team climate at work predicted depression among a sample of hospital employees. However, because the study was based on a single occupational group, it is not known whether the finding can be applied to the general population. Furthermore, the assessment of depression relied on self-reporting of whether a doctor had diagnosed depression in the participant. To our knowledge, no studies reporting the association between team climate at work and DSM-IV anxiety disorders among employees have been published.

The relationship between individual characteristics, environmental factors and alcohol consumption is complex.²² Alcohol problems result from both personal vulnerability and contextual features of the prevailing environment.²³ Prospective studies employing self-reports have generally supported the effect of stress on elevated alcohol consumption.²⁴ Low procedural justice at work has been shown to be weakly associated with an increased likelihood of heavy drinking,²⁵ while other stressful work conditions have mostly resulted in null findings.²⁶ There is, however, some evidence that work stress and job-related burnout are associated with alcohol dependence.^{27,28} Other stress factors, effort–reward imbalance at work among men and low decision latitude among women have been found to be associated with alcohol dependence.²⁷ However, we are not aware of previous studies reporting a relationship between team climate at work and DSM-IV alcohol use disorders.

This study extends earlier evidence on psychosocial work characteristics and mental disorders by examining the associations between team climate at work and mental health, as indicated by DSM-IV depressive, anxiety or alcohol use disorders, and antidepressant use. Diagnoses of DSM-IV mental disorders were assessed using a standardised psychiatric interview and the data were linked to

recorded purchases of prescribed antidepressants during a 3-year follow-up period. The nationally representative Health 2000 Study allows the results to be generalised to the whole Finnish population.

METHODS

Study sample

A multidisciplinary epidemiological survey, the Health 2000 Study, was carried out in 2000–2001 in Finland. The two-stage stratified cluster sample was representative of the population aged 30 years or over living on the Finnish mainland.^{29–30} Finland was divided into 20 strata: the 15 largest cities and the five university hospital districts, each serving approximately 1 million inhabitants, covering the remainder of Finland. Within the five strata representing the university hospital regions, 65 health care districts were sampled, applying the probability proportional to population size (PPS) method, yielding the primary sampling units. Finally, a random sample of individuals was drawn from the 15 largest towns and the 65 smaller health care districts using systematic sampling of the National Population Register. Details of the methodology of the project have been published elsewhere.²⁹

The participants were interviewed at home between August 2000 and March 2001 and were given a questionnaire which

they returned at the clinical health examination approximately 4 weeks later. The home interview sought information on background characteristics, health and illnesses, parents and siblings, use of health services, oral health, living habits, living environment, functional capacity, work and work ability, and participation in rehabilitation. The questionnaire sought information on, for example, quality of life, typical symptoms, exercise practices, use of alcohol, working conditions and job strain. The respondents received an information leaflet and their written informed consent was obtained. Participation was 87% for the interview and 84% for the health examination. Non-respondents were most often unemployed men or men with low income.³¹ Compared with participants in the CIDI (Composite International Diagnostic Interview), those who only attended the home interview were found to score more symptoms in the BDI (Beck Depression Inventory) and GHQ-12 (General Health Questionnaire) questionnaires. They were also older, more often single or widowed and had less education.⁶

Of the 5871 people in the total sample who were of working age (30–64 years), 5152 (87.8%) were interviewed and 4935 (84.1%) returned the questionnaire. A total of 4886 (83.2%) participants completed the health examination, including the structured mental health interview (CIDI). As this study focused on working conditions, only employed

Table 1 Characteristics of the participants (n = 3347)

Characteristics	Women (n = 1684)		Men (n = 1663)		p Value
	Mean (SD)	No (weighted %)	Mean (SD)	No (weighted %)	
Age	44.64 (8.36)		44.11 (8.43)		0.069
Occupational grade					<0.001
Higher non-manual		490 (29)		455 (27)	
Lower non-manual		662 (39)		260 (16)	
Manual		356 (21)		638 (39)	
Self-employed		172 (10)		302 (18)	
Marital status					<0.001
Married/co-habiting		1283 (76)		1342 (81)	
Single, divorced or widowed		401 (24)		321 (19)	
Lifetime mental disorder*					<0.001
No		1469 (89)		1540 (93)	
Yes		188 (11)		123 (7)	
Depressive, anxiety or alcohol use disorder during past 12 months†					0.81
No		1468 (87)		1455 (88)	
Yes		216 (13)		208 (12)	
Depressive disorder‡					<0.001
No		1538 (91)		1598 (96)	
Yes		146 (9)		65 (4)	
Anxiety disorder‡					0.0072
No		1602 (95)		1610 (97)	
Yes		82 (5)		53 (3)	
Alcohol use disorder‡					<0.001
No		1658 (98)		1536 (92)	
Yes		26 (2)		127 (8)	
Antidepressant use					<0.001
No		1492 (89)		1568 (94)	
Yes		192 (11)		95 (6)	
Team climate at work					0.16
Poor		556 (33)		596 (36)	
Intermediate		553 (33)		547 (33)	
Good		575 (34)		520 (31)	

*Self-reported information on doctor-diagnosed mental disorder; †diagnosis based on the CIDI (Composite International Diagnostic Interview).

participants were included. The final cohort of the present study consisted of the 3347 employed participants (1663 men and 1684 women) who had completed the team climate questionnaire.

A large national network, coordinated by the National Public Health Institute, was responsible for the planning and execution of the Health 2000 Study. The study was approved by the Ethics Committee of Epidemiology and Public Health in the Hospital District of Helsinki and Uusimaa. The participants received feedback on their health, and the possibility of a free physical examination encouraged them to participate. As a result, essential information on health and functional capacity was obtained from 93% of the sample.

Measurements

Team climate was measured with a self-assessment scale. The scale is included in the Healthy Organization Questionnaire of the Finnish Institute of Occupational Health.³² It consists of four statements regarding working conditions and atmosphere in the work place ("Encouraging and supportive of new ideas", "Prejudiced and conservative", "Nice and easy", and "Quarrelsome and disagreeing"). Responses to each statement were given on a 5-point scale ranging from 1 ("I fully agree") to 5 ("I fully disagree"). The scales of two questions were reversed in order to provide high values for good climate. The mean score was calculated and divided into tertiles (poor 1–3.25, intermediate 3.26–4.00 and good 4.01–5) for the analyses.

Mental health status was assessed at the end of the health examination using a computerised version of the World Health Organization (WHO) Composite International Diagnostic Interview (M-CIDI). The standardised CIDI interview is a structured interview developed by WHO and designed for use by trained non-psychiatric health care professional interviewers. It has been shown to be a valid assessment measure of common mental non-psychotic disorders.³³ The program uses operationalised criteria for DSM-IV diagnoses and allows the estimation of DSM-IV diagnoses for major mental disorders. The 21

interviewers were trained for the CIDI interview for 3–4 days by psychiatrists and physicians who had been trained by a WHO authorised trainer. Mental disorders were assessed using DSM-IV definitions and criteria. A participant was identified as a case if he/she fulfilled the criteria for depressive, anxiety or alcohol use disorder during the past 12 months. Depressive disorders included a diagnosis of depression or dysthymic disorder, and anxiety disorders included diagnoses of panic disorder with or without agoraphobia, generalised anxiety disorder, social phobia NOS (not otherwise specified) and agoraphobia without panic disorder. Alcohol use disorders included diagnoses of alcohol dependence and alcohol abuse.

Lifetime mental disorders were assessed by a single-item question asking whether a doctor had ever confirmed a diagnosis of mental disorder (yes/no).

Use of antidepressant medication was an indirect measure of the occurrence of mental health problems. The data were extracted from the National Prescription Register maintained by the Social Insurance Institution of Finland. The national health insurance scheme covers all permanent residents in the country, and refunds part of the costs of prescribed medication for most outpatients. Each participant's personal identification number (a unique number given all Finns at birth and used for all contacts with the social welfare and health care systems) linked the data to information on drug prescription. The WHO's Anatomical Therapeutic Chemical (ATC) classification code³⁴ is used to categorise drugs in the prescription register of the Social Insurance Institution. All the prescriptions coded as N06A (the ATC code for antidepressants) were extracted from 1 January 2001 to 31 December 2005. The follow-up time for antidepressant purchases was thus 3 years for all participants.

Sociodemographic variables included age, gender, marital status and occupational grade. Marital status was divided into three groups: those who were married or cohabiting, those who were divorced or widowed, and those who were single. Occupational grade was based on occupation and type of business: upper grade non-manual, lower grade non-manual,

Table 2 The 12-month prevalence of DSM-IV depressive, anxiety or alcohol use disorder by team climate

Team climate	Model 1*, OR (95% CI)	Model 2†, OR (95% CI)	Model 3‡, OR (95% CI)	Model 4§, OR (95% CI)	Model 5¶, OR (95% CI)
Depressive disorder	p<0.001	p<0.001	p<0.001	p<0.001	p = 0.002
Poor climate (n = 1152)	2.32 (1.64 to 3.29)	2.44 (1.72 to 3.46)	2.45 (1.72 to 3.48)	2.10 (1.48 to 2.99)	1.61 (1.10 to 2.36)
Intermediate climate (n = 1100)	0.98 (0.63 to 1.51)	1.00 (0.64 to 1.55)	1.05 (0.68 to 1.63)	0.96 (0.61 to 1.50)	0.86 (0.55 to 1.36)
Good climate (n = 1095)	1.00	1.00	1.00	1.00	1.00
Anxiety disorder	p = 0.009	p = 0.007	p = 0.006	p = 0.058	p = 0.38
Poor climate	1.98 (1.27 to 3.07)	2.02 (1.30 to 3.14)	2.08 (1.33 to 3.25)	1.72 (1.09 to 2.70)	1.26 (0.76 to 2.08)
Intermediate climate	1.57 (0.99 to 2.50)	1.59 (1.00 to 2.54)	1.69 (1.05 to 2.72)	1.57 (0.97 to 2.55)	1.44 (0.86 to 2.40)
Good climate	1.00	1.00	1.00	1.00	1.00
Alcohol use disorder	p = 0.15	p = 0.22	p = 0.35	p = 0.44	p = 0.56
Poor climate	1.41 (0.95 to 2.07)	1.34 (0.90 to 1.99)	1.26 (0.85 to 1.87)	1.19 (0.80 to 1.76)	1.06 (0.70 to 1.62)
Intermediate climate	1.43 (0.93 to 2.20)	1.41 (0.91 to 2.17)	1.36 (0.87 to 2.11)	1.33 (0.86 to 2.06)	1.29 (0.81 to 2.00)
Good climate	1.00	1.00	1.00	1.00	1.00
Any disorder**	p<0.001	p<0.001	p<0.001	p = 0.003	p = 0.32
Poor climate	1.80 (1.39 to 2.32)	1.81 (1.40 to 2.34)	1.78 (1.37 to 2.31)	1.56 (1.20 to 2.03)	1.23 (0.93 to 1.63)
Intermediate climate	1.24 (0.93 to 1.66)	1.24 (0.93 to 1.67)	1.27 (0.94 to 1.70)	1.19 (0.89 to 1.60)	1.09 (0.80 to 1.47)
Good climate	1.00	1.00	1.00	1.00	1.00

Odds ratios (OR) and 95% confidence intervals (CI).

*Without covariates; †adjusted for age and gender; ‡adjusted for age, gender, marital status and occupational grade; §adjusted for age, gender, marital status, occupational grade and self-reported lifetime mental disorders; ¶adjusted for age, gender, marital status, occupational grade, self-reported lifetime mental disorders, job tenure, job control and job demands; **any of the DSM-IV depressive, anxiety and alcohol use disorders.

Table 3 Odds ratios (OR) and 95% confidence intervals (CI) for antidepressant use by team climate at work

Team climate	Model 1*, OR (95% CI)	Model 2†, OR (95% CI)	Model 3‡, OR (95% CI)	Model 4§, OR (95% CI)	Model 5¶, OR (95% CI)	Model 6**, OR (95% CI)
	p<0.001	p<0.001	p<0.001	p = 0.012	p = 0.02	p = 0.027
Poor (n = 1152)	2.01 (1.44 to 2.80)	2.08 (1.48 to 2.92)	2.08 (1.48 to 2.92)	1.56 (1.07 to 2.27)	1.50 (1.02 to 2.19)	1.53 (1.02 to 2.30)
Intermediate (n = 1100)	1.11 (0.79 to 1.56)	1.12 (0.80 to 1.59)	1.14 (0.81 to 1.62)	0.93 (0.64 to 1.35)	0.91 (0.62 to 1.32)	0.95 (0.65 to 1.41)
Good (n = 1095)	1.00	1.00	1.00	1.00	1.00	1.00

*Without covariates; †adjusted for age and gender; ‡adjusted for age, gender, marital status and occupational grade; §adjusted for age, gender, marital status, occupational grade and self-reported lifetime mental disorders; ¶adjusted for age, gender, marital status, occupational grade, self-reported lifetime mental disorders and DSM-IV mental disorders at baseline; **adjusted for age, gender, marital status, occupational grade, self-reported lifetime mental disorders, DSM-IV mental disorders at baseline, job tenure, job demands and job control.

manual workers and self-employed. Job-related variables included job tenure (years), job demands and job control. Job demands and job control were measured with self-assessment scales. The scale of job demands comprised five items (eg, "My job requires working very fast"). The scale of job control comprised nine items (eg, "My job allows me to make a lot of decisions on my own"). Responses were given on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Mean scores of job demands and job control were treated as continuous variables.

Statistical analyses

Descriptive statistics were presented for each variable and comparisons were made using the χ^2 test or Wilcoxon test by gender. Binary logistic regression models were used to calculate odds ratios and their 95% confidence intervals for the level of team climate with respect to having 12-month anxiety disorder, depressive disorder, alcohol use disorder, any mental disorder, and at least one purchase of antidepressants during the 3-year follow-up period. These analyses were adjusted for potential confounding and mediating factors progressively added in the following order: age and gender,⁶ marital status,^{35,36} occupational grade,³⁷ lifetime mental disorders,³⁸ baseline mental disorders (for antidepressant use), and job tenure, job demands and job control. Interaction effects between gender and age with team climate predicting mental disorders and antidepressant use were also tested. Sampling parameters and weights were used in the analyses to account for the survey design complexities, including clustering in a stratified sample, and non-participation.^{29,39} The data were analysed using SAS 9.1 survey procedures and SUDAAN 9 software. SUDAAN has been specifically designed to analyse cluster-correlated data in complex sample surveys.⁴⁰

RESULTS

Women had non-manual occupations more often and were more likely to be divorced, widowed or single than men (table 1). A higher proportion of women than men also reported lifetime mental disorders. When looking at all the studied disorders together, there was no difference in the prevalence of having any of the three mental disorders between women and men. A greater proportion of women than men had depressive or anxiety disorders and also had higher antidepressant usage during the follow-up-period. Alcohol use disorder was more common among men compared with women. No gender difference in the experienced team climate was found.

Team climate was associated with 12-month DSM-IV depressive and anxiety disorders but not with alcohol use disorders (table 2). Poor team climate was related to a higher probability of having a depressive and an anxiety disorder compared with good team climate. When adjusted for job

demands and job control (model 5), the significance of the association between team climate and anxiety disorders was attenuated. No statistically significant interaction effect between gender or age and team climate was found regarding DSM-IV mental disorders.

During the 3-year follow-up period, 287 participants (9%) had purchased antidepressants at least once. There was a significant gender difference: 11% of women and 6% of men had purchased antidepressant medication (p<0.001). In the fully adjusted model, team climate was associated with subsequent antidepressant use (table 3). Poor team climate predicted antidepressant use with an odds ratio of 1.53 (95% CI 1.02 to 2.30). No interaction effect between gender or age and team climate was found for antidepressant use (p>0.17).

To examine whether there was bias due to a potential overlapping of the interview date and antidepressant purchase, we re-analysed our data by excluding the 498 participants who were interviewed at the beginning of 2001 as 20 of these 498 participants had also purchased antidepressants in 2001. The odds ratio for poor team climate adjusted for covariates in the additional analysis was 1.59 (95% CI 1.04 to 2.44) in relation to antidepressant use. Thus, the subgroup analysis replicated the original findings.

DISCUSSION

Main findings

This nationally representative study with a high rate of participation of Finnish employees over 30 years of age showed that poor team climate at work was associated with depressive disorders and predicted subsequent antidepressant medication. Poor team climate was also associated with anxiety disorders, but this association became insignificant when adjusted for job control and job demands. Poor team climate was not related to alcohol use disorders.

To our knowledge, this is the first study to investigate the relationship between team climate at work and mental health using approximates for DSM-IV depressive, anxiety and alcohol use disorders,⁴¹ and antidepressant use in a working population. There are only few previous reports on team climate at work and mental health and the results of these mostly cross-sectional studies have been ambiguous. In one study, poor climate was associated with psychological distress symptoms,²⁰ while in another, good climate was related to a lower probability of mental distress.⁴² In one prospective study among nurses, social climate in the work unit did not predict psychological distress at follow-up.⁴³ In another report, poor team climate predicted self-reported depression among a sample of hospital employees.²¹ Only one of the earlier studies was population based²⁰ but in that study, the assessment of depression and psychological distress relied on self-reported symptoms. Other psychosocial factors, such as low support

from a supervisor and colleagues, have also been shown to be associated with depression and anxiety disorders.^{9, 10} Recently, low social capital in the workplace was shown to predict self-reported depression and register-based antidepressant use among public sector employees.⁴⁴

It has been suggested that depression is mostly associated with loss and deprivation, while anxiety is more likely to result from experiences of threat or danger.⁴⁵ In our study, poor team climate at work was significantly associated with both depressive and anxiety disorders, although the association between team climate and anxiety disorders attenuated when adjusted for job demands and job control. A quarrelsome and disagreeing climate or interpersonal conflicts at work may generate feelings of threat or danger and result in an anxiety disorder. Psychosocial deficiencies in team climate may also represent deprivation of support, currency or shared decision-making and, therefore, expose workers to depression. In our study, women were diagnosed more often than men as having depressive or anxiety disorders, while men were over-represented with regard to alcohol use disorders. This is in line with earlier results.³⁵ Women have been found to have a higher prevalence of most affective disorders and non-affective psychosis, and men to have higher rates of substance use disorders. Psychiatric comorbidities are also a usual finding: 70 of our subjects had more than one mental disorder (depressive, anxiety or alcohol use disorder). The number of participants with comorbidities was not enough to allow statistical analyses.

Earlier findings on the association between psychosocial work environment and alcohol use have also been mixed. Effort-reward imbalance at work among men and low decision latitude among women have been related to alcohol dependence,²⁷ while job-related burnout has been associated with alcohol dependence in both sexes.²⁸ Low procedural justice at work has been shown to be weakly associated with an increased likelihood of heavy drinking,²⁸ unlike other stressful work conditions which have shown no association with problematic alcohol use.²⁶ In the present study, we did not find evidence of an association between poor team climate at work and alcohol use disorders. Alcohol use disorders can be influenced by personality factors, general socioeconomic conditions and psychosocial factors not related to the work environment.⁴⁶ However, this is probably the first study to examine the association between poor team climate at work and DSM-IV defined alcohol use disorders using a structured interview such as the CIDI.

We found that after adjustment for baseline mental disorders, a poor team climate at work predicted antidepressant use during follow-up. In this part of the study, problems caused by reversed causality and reporting bias were avoided by using a prospective design and independent national register data. According to clinical practice guidelines on managing depression, antidepressant medication is considered an indicator of a psychiatric disorder requiring pharmacological treatment.^{47, 48} The association between poor team climate and antidepressant medication may indicate the onset of a new depressive or anxiety disorder or a relapse in these disorders requiring medical treatment due to a prolonged negative work atmosphere.

Strengths and limitations

One of the strong points of this study is its representative sample. The participants represented the entire Finnish working population over 30 years of age. The use of a representative sample allows careful generalisation of these findings to the Finnish workforce in this age group. The participation rate in the Health 2000 Study was high at 87% in the interview and

Main message

Poor team climate at work is associated with depressive disorders and antidepressant use.

Policy implications

- ▶ More prospective research is needed to elucidate the relationship between team climate at work and mental health problems.
- ▶ Intervention studies to validate practices to develop psychosocial factors at work are also called for.

84% in the health examination. Non-participation did not have a large influence on our study because the non-respondents were most often unemployed men³¹ who were not the target of our study.

There are, however, some limitations. Firstly, due to the cross-sectional design of the first part of our study investigating the association between team climate and DSM-IV mental disorders, our results are open to reversed causality. It is possible that employees with mental disorders perceive their team climate to be poorer than their healthy colleagues or they worsen team climate by their own behaviour. The association between poor team climate and a mental disorder should, therefore, be further examined in a longitudinal setting.

Secondly, our measure of antidepressant medication as an indicator of depressive or anxiety disorders is likely to be an underestimation of the actual prevalence of these disorders. It is estimated that only one quarter of individuals identified as having a depressive or anxiety disorder receive pharmacological treatment for their mental health problems. According to some studies, fewer than 30% of people suffering from depression have received pharmacological treatment⁴⁹ and only 40% of those with an anxiety disorder used psychotropic medication.⁵⁰ Therefore, using antidepressant medication as an indicator of these disorders is likely to have excluded individuals who had not sought medical help for their mental health problems or had received other treatment. However, the advantage of using register data on antidepressant use is its accuracy because it covered all outpatient prescriptions for the cohort.

Thirdly, the interviews were carried out between August 2000 and March 2001. Twenty of 498 participants who were interviewed at the beginning of 2001 had also purchased antidepressant during 2001, which may have caused some overlapping between the exposure and the outcome. However, excluding these 498 participants resulted in findings similar to the original analysis, which suggests that there was no such bias in this study.

Factors from non-work areas may contribute to mental disorders. In our study, marital status was the factor most clearly related to non-work life. Unfortunately, data on negative life events, an important predictor of mental disorders, were not available.

Finally, the team climate scale comprised four questions. Although there are team climate inventories consisting of a larger number of questions,⁵¹ our short scale has proved to be a valid measure and has been used in many studies by the Finnish Institute of Occupational Health.³²

Conclusion

Poor team climate at work was associated with DSM-IV depressive disorders and predicted future antidepressant medication. As these common mental disorders are a major cause of work disability and account for a considerable proportion of the disease burden, more attention should be paid to psychosocial factors at work.

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III

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III

The Association of Social Support at Work and in Private Life With Sleeping Problems in the Finnish Health 2000 Study

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Objective: To investigate the associations of social support at work and in private life with sleeping problems and use of sleep medication. **Methods:** In the nationwide Health 2000 Study, with a cohort of 3430 employees, social support at work and in private life, and sleep-related issues were assessed with self-assessment scales. Purchases of sleep medication over a 3-year period were collected from the nationwide pharmaceutical register of the Social Insurance Institution. **Results:** Low social support from supervisor was associated with tiredness (odds ratio [OR] 1.68, 95% confidence interval [CI] = 1.26 to 2.23) and sleeping difficulties within the previous month (OR 1.74, 95% CI = 1.41 to 1.92). Low support from coworkers was associated with tiredness (OR 1.55, 95% CI = 1.41 to 1.92), sleeping difficulties within the previous month (OR 1.77, 95% CI = 1.32 to 2.36), and only among women, with short sleep duration (OR 2.06, 95% CI = 1.22 to 3.47). Low private life support was associated with short sleep duration (OR 1.49, 95% CI = 1.13 to 1.98) and among women, with sleeping difficulties (OR 1.46, 95% CI = 1.08 to 1.33). **Conclusions:** Low social support, especially at work, is associated with sleeping-related problems.

Sleeping problems are common in working populations.¹ Prevalence of sleeping problems, depending on their definition, is between 5% and 48% in adult populations in the Western world.² When defined according to diagnostic and statistical manual of mental disorders version IV criteria, prevalence of insomnia was 11.7% among Finnish adults in 2000.³ In Sweden and in Finland, work-related sleeping problems increased rapidly from 1995 to 2000, whereas in many countries, for example in Germany and Southern Europe, no comparable change occurred.⁴ The main types of self-reported sleeping problems are difficulties in falling asleep, fragmentary sleep, and early awakening without being able to fall asleep again. Primary sleep disorders according to diagnostic and statistical manual of mental disorders version IV include difficulties initiating or maintaining sleep or non-restorative sleep with a duration of at least 1 month.

Sleeping problems may cause various occupational difficulties. Consequences at work of a sleeping problem include reduced productivity, increased accidents-at-work rates, absenteeism, and interpersonal difficulties.⁵⁻⁷ Related daytime tiredness is also a substantial risk factor for fatal occupational accidents.⁸ Sleep deprivation, a common consequence of a sleep disturbance, may lead to

impairment of neurobehavioral functioning similar to those seen in 1‰ drunkenness⁸ and weaken performance, especially in vigilance tasks.⁹ At an individual level, sleep deficit may cause unfavourable changes in psycho-physiological functioning, the immune system, the glucose metabolism, and nutrition.¹⁰ Therefore, sleep disturbances can be additional risk factors for being overweight or having arterial hypertension, adult diabetes, common atherosclerosis, and sleep disturbances have even found to be associated with premature death.¹¹⁻¹⁴ Sleeping problems can also be a risk factor for mental disorders, for example depression.¹⁵ Self-reported approximate sleep duration of less than 7 hours or more than 8 hours has been found to associate with impaired health and even with increased mortality in several epidemiologic studies.¹⁶⁻¹⁸ All in all, high prevalence of sleeping problems and tiredness among employees constitute an important quality of life, occupational health, and safety problem.

Work stress refers to aspects of work design, organization, and management that have the potential to cause harm to employee health. To study the health aspects of stressful work characteristics, general theoretical work stress models, such as the job strain model¹⁶ and the effort-reward imbalance model,¹⁴ have been developed and tested. Work demands, control, and social support based on the job-strain model, tend to have a strong cross-sectional relationship to daytime fatigue, insomnia, and symptoms of sleep deprivation independent of work hours and factors such as physical activity, smoking, and alcohol consumption.^{11,15,16}

Studies have shown social support to be an important health-related psychosocial factor at work,^{17,18} which also reduces work stress¹⁹ and increases job satisfaction.²⁰ Gender differences in social support suggest that women give and receive more support than men,²¹ but the favorable effect of support is stronger for men than for women.^{20,24,25} However, studies investigating social support both at work and in private life, and sleeping problems are scarce. In a cross-sectional study in the Stockholm district, lack of social support at work was found to be a risk indicator for disturbed sleep.¹² In another cross-sectional study, the BELSTRESS study on more than 21,000 workers in Belgium, low social support at work was associated with higher levels of tiredness, sleeping problems, and the use of psychoactive drugs.²² A case-referent study in the two northernmost counties in Sweden showed low social support in private life to associate with poorer sleep among women but not among men.²³ A cross-sectional study among 1161 male white-collar employees of an electric equipment manufacturing company showed an association between low social support from coworkers and insomnia but no association between low support from a supervisor or from family and friends and insomnia.²⁴ The association between coworker support and insomnia failed to reach significance when adjusted for confounding factors. One prospective study has been published on this topic, focusing on 100 postal workers and showing low social support to have a negative impact on sleep quality.²⁵

The earlier studies on social support and sleeping problems have used various occupational cohorts, which may explain the partially inconsistent results obtained. No population-based studies which would have nationally represented all kinds of jobs have

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been published on the subject. In the present study, we examined self-reported social support at work and in private life, and sleeping problems in a cohort of Finnish employees using the population-based sample from the Health 2000 Study, which represents nationally the diversity of all kinds of jobs. Our study included two phases: a cross-sectional phase including self-reports of social support and sleeping problems, and a longitudinal phase including self-reported social support at baseline and data on recorded purchases of prescribed sleep medication during a 3-year follow-up period.

METHODS

Study Sample

A multidisciplinary epidemiologic health survey, the Health 2000 Study, was performed in Finland between August 2000 and June 2001. The two-stage stratified cluster sample comprised the Finnish population older than 30 years and included 8028 persons.²⁶ Five university hospital districts were used for the stratification and sampling, each serving approximately 1 million inhabitants and differing in several features related to geography, economic structure, health services, and the socio-demographic characteristics of the population. From each university hospital region, 16 health care districts were sampled as clusters. The 15 largest cities were all included with a probability of one and 65 other areas were sampled applying the probability proportional to population size method. Finally, from each of these 80 areas, a random sample of individuals was drawn from the National Population Register. Details of the methodology of the project have been published elsewhere.²⁶

The participants were interviewed at home between August 2000 and March 2001. The content areas of the home interview were, among others, background information, health and illnesses, questions concerning parents and siblings, health services, living habits, functional capacity, work and work ability, and rehabilitation. The participants were given a questionnaire which they returned at a clinical health examination. The content areas of the questionnaire were, for example, quality of life, usual symptoms, physical activity, alcohol consumption, mental health, job perception and job strain, and working conditions. The respondents received an information leaflet and their written informed consent was obtained. The study was approved by the Ethics Committee of Epidemiology and Public Health in the Hospital District of Helsinki and Uusimaa. Of the original sample ($N = 8028$), participation in the interview was 87% and 84% in the health examination. The non-participants were most often unemployed men or men with low income.²⁷

Of the total sample, 5871 persons were of working age (30 to 64 years), 5152 of them (87.8%) were interviewed, and 4935 persons (84.1%) returned the questionnaire. Only employed participants were included. The final cohort of the present study comprised the 3430 employed participants (1699 men and 1731 women) who had answered the social support and sleep questions.

Measures

Social Support

Social support was measured with self-assessment scales. The measure of social support at work was from the Job Content Questionnaire.²⁸ The scale comprised two items (“When needed, my closest superior supports me” and “When needed, my fellow workers support me”). Responses were given on a five-point scale ranging from one (fully agree) to five (fully disagree). The scale was reversed in order to give high values for good support. For further analyses, alternatives 1 and 2 as well as 4 and 5 of the single items were combined to make three-point scales.

The measure of social support in private life used is a part of the Social Support Questionnaire.^{29,30} The scale comprised four

items (“On whose help can you really count when you feel exhausted and need relaxation?,” “Who do you think really cares about you no matter what happened to you?,” “Who can really make you feel better when you feel down?,” and “From whom do you get practical help when needed?”) reflecting different ways to give support. Respondents could choose one or more of six alternatives (husband, wife or partner, some other relative, close friend, close neighbor, someone else close, no one) giving support. The score of private life support was formed by combining the sources giving support and the items reflecting the nature of support. The score ranged from 0 to 20. For analyses, the score was divided into tertiles (low—0 to 4; intermediate—5 to 8; and high—9 to 20). Cronbach α was 0.71 for the private life support.

Sleep-Related Measures

We used three questions to measure self-reported sleeping problems.²⁶ Daytime tiredness was assessed with the question “Are you usually more tired during daytime than other people of your age (no/yes)?” Sleeping difficulties were assessed with the question from the SCL-90³¹ “Have you had some of the following usual symptoms and troubles within the last month: . . . sleeping disorders or insomnia . . .?” Sleep duration was assessed with “How many hours do you sleep in 24 hours?”

We also assessed sleeping problems indirectly with the use of prescribed sleep medication. The prescriptions were extracted from the National Prescription Register managed by the Social Insurance Institution of Finland. National health insurance covers the total Finnish population and refunds part of the costs of prescribed medication for practically all patients if the medicine expenses exceed 10 Euros (2003). Each participant’s personal identification number (a unique number given to all Finns at birth and used for all contacts with the social welfare and health care systems) linked the survey data to the register-based information on drug prescription. Outpatient prescription data based on the WHO’s Anatomical Therapeutic Chemical (ATC) classification code³² is in the prescription register of the Social Insurance Institution. All the prescriptions coded as N05C (the ATC code for sleep medication) were extracted from January 1, 2001 to December 31, 2003.

Sociodemographic Variables

Sociodemographic variables included age, gender, marital status, children aged <7 years in the household (yes/no), occupational grade, and shift work (yes/no). Marital status was divided into two categories: married/cohabiting and divorced/widowed/single. Occupational grades were formed on the basis of occupation and type of employment: upper grade non-manual employees, lower grade non-manual employees, manual workers, and self-employed.³³

Health and Health Behavior Variables

Health status was operationalized as perceived health through the following question: “Is your present state of health: good; rather good; moderate; rather poor; poor?” The following lifestyle variables were used: physical activity during leisure time four times per week or more (yes/no), body mass index (kilograms per meter squared), alcohol consumption (grams per week), smoking (yes/no), and drinking coffee or tea daily (yes/no).

Statistical Analyses

Descriptive statistics were presented for each variable by gender and comparisons were made using the χ^2 test or Wilcoxon test. Binary logistic regression models were used to calculate adjusted odds ratios (ORs) and their 95% confidence intervals (CIs) separately for two types of sleep problems, and for the probability of having at least one purchase of sleep medication during the 3-year period. Sleep duration was analyzed using multinomial logistic regression with sleeping hours 7 to 8 as the reference category. Analyses of the association of these outcomes with social

support were progressively adjusted for the potential confounding factors,^{12,23,34–39} by adding first sociodemographic factors (ie, age, gender, marital status, occupational grade, children aged <7 years in the household and shift work), and then perceived health and health behaviors (ie, physical activity during leisure time, body mass index, alcohol consumption, smoking, and daily drinking coffee or tea). The analyses regarding the use of sleep medication were lastly adjusted for the use of sleep medication in 2000. Interaction effects between gender and social support predicting sleeping problems and sleeping medicine use were also tested because in earlier studies men and women have been found to be vulnerable to partly different psychosocial characteristics in their work and domestic environments.⁴⁰ If any significant interactions emerged, the genders were analyzed separately.

Sampling parameters and weighting adjustment were used in the analyses to account for the survey design complexities, including clustering in a stratified sample, and non-participation.^{26,41} The data were analyzed using the SAS 9.1/ the SUDAAN 9 software. SUDAAN has been specifically designed to analyze cluster-correlated data in complex sample surveys.⁴²

RESULTS

The characteristics of the study participants by gender are shown in Table 1. A greater proportion of women than of men were lower non-manual workers (40% and 16%, respectively) and a greater proportion of men than of women were manual workers or self-employed (57% and 31%, respectively). A greater proportion

TABLE 1. Characteristics of the Participants (N = 3,430)

Characteristics	Women (N = 1,731)		Men (N = 1,699)		P
	Mean (SD)	Number (Weighted %)	Mean (SD)	Number (Weighted %)	
Age	44.7 (8.38)		44.1 (8.46)		0.06
Occupational grade					<0.0001
Higher nonmanual		503 (28.9)		464 (27.3)	
Lower nonmanual		684 (39.7)		268 (15.9)	
Manual		374 (21.8)		661 (39.2)	
Self-employed		166 (9.6)		298 (17.6)	
Marital status					0.001
Married/cohabiting		1,313 (75.8)		1,363 (80.2)	
Single, divorced, or widowed		418 (24.2)		336 (19.8)	
Daytime tiredness					0.98
No		1,064 (81.8)		962 (81.8)	
Yes		236 (18.2)		212 (18.2)	
Sleeping difficulties within the last month					0.0003
No		1,212 (69.7)		1,279 (75.3)	
Yes		517 (30.3)		417 (24.7)	
Sleep duration					<0.0001
6 hrs or less		181 (11.3)		246 (15.9)	
7–8 hrs		1,293 (78.8)		1,224 (79.3)	
9 hrs or more		165 (9.9)		74 (4.7)	
Sleeping medicine during 2001–2003					0.010
No		1,645 (94.9)		1,642 (96.7)	
Yes		86 (5.1)		57 (3.3)	
Social support at work (1–5)	4.01 (0.91)		3.88 (0.97)		<0.0001
From supervisor					0.001
Low		257 (14.9)		302 (17.8)	
Intermediate		235 (13.6)		279 (16.4)	
High		1,239 (71.5)		1,118 (65.8)	
From coworkers					0.022
Low		114 (83.8)		123 (7.3)	
Intermediate		166 (9.5)		211 (12.4)	
High		1,451 (83.8)		1,365 (80.3)	
Social support in private life (0–20)	7.39 (2.99)		6.32 (2.94)		<0.0001
Low		385 (22.6)		644 (38.0)	
Intermediate		788 (45.5)		706 (41.4)	
High		558 (31.0)		349 (20.6)	

of women than of men were divorced, widowed, or single (24% and 20%, respectively). Women also reported getting more social support both at work (mean, 4.0 and 3.9, respectively) and in private life (mean, 7.4 and 6.3, respectively) than men.

About 18% of men and women reported daytime tiredness. The association between social support and daytime tiredness is shown in Table 2. When compared to high social support, low social support from the supervisor was related to tiredness with OR of 1.68 (95% CI = 1.26 to 2.23) after adjustments and the respective odds related to intermediate support was 1.45 (95% CI =

1.03 to 2.06). Also low and intermediate support from coworkers was related to tiredness in the fully adjusted model (OR 1.55, 95% CI = 1.02 to 2.37 and OR 2.04, 95% CI = 1.47 to 2.85, respectively). The association for private life support found in the unadjusted model failed to reach significance after adjustments.

Of the participants, 27% had suffered from sleeping difficulties within the last month. Table 3 presents the association between social support and sleeping difficulties. Both low and intermediate support from a supervisor (OR 1.74, 95% CI = 1.41 to 1.92 and OR 1.53, 95% CI = 1.22 to 1.92, respectively) and

TABLE 2. Daytime Tiredness by Social Support, OR and CI

Social Support	Model 1*		Model 2†		Model 3‡	
	P	OR	P	OR	P	OR
From supervisor	<0.0001		<0.0001		<0.0001	
High (N = 2,357)		1.00		1.00		1.00
Intermediate (N = 514)		1.50 (1.12–2.02)		1.55 (1.13–2.12)		1.45 (1.03–2.06)
Low (N = 559)		2.00 (1.54–2.60)		2.08 (1.58–2.74)		1.68 (1.26–2.23)
From coworkers	<0.0001		<0.0001		<0.0001	
High (N = 2,816)		1.00		1.00		1.00
Intermediate (N = 377)		2.12 (1.58–2.85)		2.13 (1.58–2.89)		2.04 (1.47–2.85)
Low (N = 237)		2.00 (1.54–2.60)		1.70 (1.15–2.52)		1.55 (1.02–2.37)
In private life§	0.073		0.24		0.017	
High (N = 907)		1.00		1.00		1.00
Intermediate (N = 1,494)		0.96 (0.74–1.23)		0.92 (0.72–1.18)		0.84 (0.64–1.09)
Low (N = 1,029)		1.37 (1.06–1.78)		1.28 (0.97–1.69)		1.07 (0.79–1.44)

*Without covariates.

†Adjusted for age, gender, marital status, occupational grade, children <7 years in the household, and shift work.

‡Adjusted further for perceived health, physical activity during leisure time, body mass index, alcohol consumption, smoking, and daily drinking coffee or tea.

§Social support in private life not adjusted for marital status.

TABLE 3. Sleeping Difficulties Within the Last Month by Social Support, OR and CI

Social Support	Model 1*		Model 2†		Model 3‡	
	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)
From supervisor	<0.0001		<0.0001		<0.0001	
High (N = 2,357)		1.00		1.00		1.00
Intermediate (N = 514)		1.51 (1.23–1.85)		1.60 (1.28–1.98)		1.53 (1.22–1.92)
Low (N = 559)		1.85 (1.52–2.25)		1.99 (1.63–2.43)		1.74 (1.41–1.92)
From coworkers	<0.0001		<0.0001		<0.0001	
High (N = 2,816)		1.00		1.00		1.00
Intermediate (N = 377)		1.50 (1.18–1.91)		1.56 (1.23–1.98)		1.48 (1.14–1.91)
Low (N = 237)		1.95 (1.48–2.57)		1.93 (1.46–2.57)		1.77 (1.32–2.36)
In private life§						
Men	0.055		0.24		0.41	
High (N = 349)		1.00		1.00		1.00
Intermediate (N = 706)		0.97 (0.71–1.32)		0.95 (0.69–1.30)		0.90 (0.65–1.25)
Low (N = 237)		1.27 (0.96–1.70)		1.15 (0.86–1.55)		1.07 (0.79–1.45)
Women	<0.0001		0.001		0.021	
High (N = 558)		1.00		1.00		1.00
Intermediate (N = 788)		1.21 (0.94–1.57)		1.11 (0.85–1.45)		1.04 (0.79–1.37)
Low (N = 385)		2.01 (1.52–2.65)		1.68 (1.25–2.24)		1.46 (1.08–1.33)

*Without covariates.

†Adjusted for age, gender, marital status, occupational grade, children aged <7 years in the household, and shift work.

‡Adjusted further for perceived health, physical activity during leisure time, body mass index, alcohol consumption, smoking, and daily drinking coffee or tea.

§Social support in private life not adjusted for marital status.

||P = 0.02 for interaction gender × social support in private life.

coworkers (OR 1.77, 95% CI = 1.32 to 2.36 and OR 1.48, 95% CI = 1.14 to 1.91, respectively) was associated with sleeping difficulties after adjustments. A statistically significant interaction effect between gender and support in private life on sleeping difficulties was found. Low support in private life was associated with sleeping difficulties among women but not among men.

About 12% of the participants reported sleeping only 6 hours or less per night and 7% reported sleeping 9 hours or more per night. Low supervisor support was associated with short sleep duration in the model adjusted for socio-demographic and occupational covariates (OR 1.47, 95% CI = 1.08 to 1.99), but the association attenuated in fully adjusted model (Table 4). Supervisor support assessed as intermediate, when compared with high, was related to lower odds of long sleep duration (OR 0.52, 95% CI = 0.31 to 0.86). A statistically significant interaction effect was found between gender and coworker support on sleep duration. Low and intermediate social support from coworkers was associated with higher probability of short sleep duration among women after all adjustments (OR 2.06, 95% CI = 1.22 to 3.47 and OR 1.66, 95% CI = 1.02 to 2.70, respectively). Low and intermediate coworker support was related to long sleep duration among men in the unadjusted model but the association attenuated when it was fully adjusted. Low social support in private life was not significantly related to long sleep duration.

Altogether 143 persons (4.2%) had received a refund for their purchases of sleep medication during 2001–2003. Low supervisor support was associated with the use of sleep medication after adjustments for socio-demographic, occupational, and health-related covariates (OR 1.65, 95% CI = 1.11 to 2.46) but the association failed to reach significance when adjusted for sleep medication use at baseline (Table 5). Coworker support was not related to sleep medication use. Low private life support was

associated with the use of sleep medication before (OR 1.56, 95% CI = 1.00 to 2.45) but not after adjustment for covariates and baseline sleep medication use.

DISCUSSION

In our study, using a representative nationwide cohort of 3430 employed Finnish men and women older than 30 years of age, we found associations between the level of social support at work and in private life and sleeping problems. We used four different indicators of sleeping problems; three of them were self-reported using a cross-sectional design, and one, the use of sleep medication, was register-based using a longitudinal design.

Sleeping problems cover a collection of symptoms with a variety of etiological and background factors. Even the same symptoms may have different etiology in different persons.¹⁵ In the present study, low support from separate sources in the adjusted models was associated with different kinds of sleeping problems. Low social support from a supervisor was associated with self-reported daytime tiredness and sleeping difficulties within the previous month. Low support from coworkers was also associated with daytime tiredness and sleeping difficulties within the previous month, and in addition with short sleep duration. Low private life support was associated with short sleep duration, and in women, with sleeping difficulties within the previous month. All in all, it seems that low social support at work is more detrimental to sleep than low private life support at the working population level. In our study, private life support was measured by asking the respondents to identify the sources giving support and counting them. Respondents who reported only one close person were classified as those with “low support in private life.” However, it may be enough to have at least one close person giving support when sleeping

TABLE 4. Sleep Duration by Social Support, OR and CI

Social Support	OR (95% CI)					
	Model 1*		Model 2†		Model 3‡	
	Short§	Long	Short§	Long	Short§	Long
From supervisor	<i>P</i> = 0.009		<i>P</i> = 0.007		<i>P</i> = 0.015	
High	1.00	1.00	1.00	1.00	1.00	1.00
Intermediate	1.21 (0.91–1.60)	0.54 (0.33–0.89)	1.23 (0.91–1.65)	0.56 (0.34–0.93)	1.22 (0.90–1.64)	0.52 (0.31–0.86)
Low	1.39 (1.04–1.86)	1.11 (0.78–1.59)	1.47 (1.08–1.99)	1.13 (0.79–1.63)	1.37 (0.99–1.89)	1.02 (0.70–1.48)
From coworkers¶	<i>P</i> = 0.040		<i>P</i> = 0.088		<i>P</i> = 0.190	
Men	<i>P</i> = 0.040		<i>P</i> = 0.088		<i>P</i> = 0.190	
High	1.00	1.00	1.00	1.00	1.00	1.00
Intermediate	1.18 (0.80–1.74)	1.93 (1.07–3.49)	1.21 (0.82–1.79)	1.90 (1.04–3.47)	1.12 (0.80–1.74)	1.67 (0.90–3.11)
Low	1.30 (0.79–2.13)	2.22 (1.06–4.64)	1.23 (0.70–2.17)	2.11 (0.92–4.85)	1.19 (0.67–2.11)	2.08 (0.92–4.72)
Women	<i>P</i> < 0.001		<i>P</i> = 0.002		<i>P</i> = 0.007	
High	1.00	1.00	1.00	1.00	1.00	1.00
Intermediate	1.63 (1.02–2.59)	1.23 (0.75–2.01)	1.59 (0.99–2.56)	1.23 (0.75–2.00)	1.66 (1.02–2.70)	1.16 (0.70–1.92)
Low	2.45 (1.51–3.96)	1.52 (0.81–2.85)	2.24 (1.36–3.69)	1.69 (0.89–3.22)	2.06 (1.22–3.47)	1.59 (0.84–3.01)
In private life#	<i>P</i> < 0.0001		<i>P</i> = 0.003		<i>P</i> = 0.007	
High	1.00	1.00	1.00	1.00	1.00	1.00
Intermediate	1.22 (0.95–1.58)	1.05 (0.78–1.43)	1.08 (0.83–1.41)	1.21 (0.89–1.65)	1.04 (0.79–1.37)	1.19 (0.87–1.63)
Low	2.01 (1.54–2.61)	0.99 (0.72–1.38)	1.55 (1.17–2.04)	1.44 (1.00–2.07)	1.49 (1.13–1.98)	1.38 (0.95–2.01)

*Without covariates.

†Adjusted for age, gender, marital status, occupational grade, children <7 years in the household, and shift work.

‡Adjusted further for perceived health, physical activity during leisure time, body mass index, alcohol consumption, smoking, and daily drinking coffee or tea.

§Sleep duration 6 hrs or less.

||Sleep duration 9 hrs or more.

¶*P* = 0.0034 for interaction gender × coworker support (*P* = 0.0034).

#Social support in private life not adjusted for marital status.

TABLE 5. Use of Sleep Medication During 3-Year Follow-Up by Social Support, OR and CI

Social Support	Model 1*		Model 2†		Model 3‡		Model 4§	
	P	OR	P	OR	P	OR	P	OR
From supervisor	0.001		<0.0001		<0.0001		0.57	
High (N = 2,357)		1.00		1.00		1.00		1.00
Intermediate (N = 514)		1.09 (0.65–1.83)		1.09 (0.64–1.85)		0.98 (0.56–1.71)		1.26 (0.67–2.35)
Low (N = 559)		2.02 (1.41–2.90)		1.95 (1.34–2.83)		1.65 (1.11–2.46)		1.32 (0.75–2.32)
From coworkers	0.195		0.392		0.478		0.76	
High (N = 2,816)		1.00		1.00		1.00		1.00
Intermediate (N = 377)		0.90 (0.50–1.61)		0.89 (0.49–1.62)		0.89 (0.49–1.61)		0.76 (0.30–1.90)
Low (N = 237)		1.61 (0.94–2.74)		1.43 (0.82–2.48)		1.37 (0.78–2.38)		1.14 (0.56–2.32)
In private life	0.064		0.172		0.319		0.29	
High (N = 907)		1.00		1.00		1.00		1.00
Intermediate (N = 1,494)		1.07 (0.66–1.72)		1.01 (0.61–1.67)		0.97 (0.57–1.63)		0.78 (0.45–1.37)
Low (N = 1,029)		1.56 (1.00–2.45)		1.44 (0.87–2.38)		1.31 (0.76–2.26)		0.60 (0.31–1.14)

*Without covariates.

†Adjusted for age, gender, marital status, occupational grade, children <7 years in the household, and shift work.

‡Adjusted further for perceived health, physical activity during leisure time, body mass index, alcohol consumption, smoking, and daily drinking coffee or tea.

§Adjusted further for the use of sleep medication at baseline.

||Social support in private life not adjusted for marital status.

problems are considered. Furthermore, the wording of the scales of support at work and in private life differed to a certain extent and there is a possibility that they indicated the phenomenon in a slightly different way.

In our study, low support both from supervisor and coworkers was associated with daytime tiredness. Tiredness is a general symptom, which may be related to various psychiatric and somatic illnesses as well as to work stress and work-related exhaustion. According to the Job strain model by Karasek and Theorell,¹¹ lack of social support is one factor among working conditions causing psychosocial stress and ill health. The concept of tiredness has also been considered to include from three to five dimensions: general, mental, and physical tiredness and sleepiness, and sometimes lack of motivation or activity.⁴³ In the present study, daytime tiredness was queried by only one question and participants might have interpreted it as one or more various aspects when assessing their own tiredness. On the other hand, accumulating lack of sleep has been shown to weaken work motivation, knowledge processing functions in the brain, and task management and vigilance at work, and to cause accidents at work.⁴⁴ However, tiredness in turn, might also cause stress at work. Tiredness is a particular element of danger for persons whose duties and other tasks require a high level of alertness.

We also found an association between low support from a supervisor and coworkers and sleeping difficulties, as measured by questions about whether the participant had sleeping disorders or insomnia within the previous month. However, low private life support was associated with these sleeping difficulties only among women. Continuous insomnia may result in large-scale consumption of health care services and risk of developing depressive, anxiety, and alcohol use disorders.¹⁵ Insomnia is a common sign in depression.⁴⁵ Although life dissatisfaction does not directly predict poor sleep, poor sleep doubles the risk for later life dissatisfaction.⁴⁶ In line with our findings, earlier studies showed that people who are satisfied with their work tend to have less sleeping problems than those unsatisfied.^{12,47}

In our study, low support from coworkers among women and low support in private life were associated with short sleep duration. There was also an association between low support from a supervisor and short sleep duration, but the association failed to

reach significance with further adjustment. There was also a negative association between intermediate supervisor support and long sleep duration. The explanation for this negative association is perhaps the low number of persons who reported intermediate support and long sleep duration. There were 175 persons getting high support from supervisor and having long sleep duration but only 21 such persons in the group of intermediate support. The only association between social support and extra long sleep duration was found concerning the support from coworkers among men before adjustment for covariates. Persons with short sleep duration are a heterogeneous group also including those who are secondary insomniacs and sleep-deprived as well as those who manage with short sleep by nature.¹⁵ Sleep deprivation strongly influences mood, cognitive function, and motor performance. Extended sleep is also a common symptom in depression.⁴⁸ However, self-reported sleep duration may also reflect more time spent in bed than actual sleeping time.

Our measurement of sleeping medicine prescriptions was based on register data. This measurement is likely to be an underestimation of the actual prevalence of sleep disorders because only a part of people with sleep disorders use pharmaceutical treatment and those who use do not always get a refund for minor sleep medication use. It is recommended to prescribe sleep medication only for temporary use, ie, less than 2 weeks.¹⁵ A prescription of sleep medication for long-term use, ie, more than 4 weeks, is not recommended because the medication might decrease the functional ability of the patient, lead to tolerance of medication, and cause addiction. Long-term use of sleep medication might also cause insomnia. Because sleeping medicines are quite affordable and the amounts of medicine in one prescription usually quite small, the use may not always reach the level to receive a refund. Therefore, it is possible that the outcome used in our study reflects quite excessive use. In our study, 143 participants (4%) had received a refund for part of the costs of prescribed sleep medication during the 3-year period. However, we noticed an association between low supervisor support and subsequent consumption of sleeping medicine which was no longer significant after adjustment for sleep medication use at baseline. This implies that social support and use of sleep medication are related but the causal connection between them cannot be absolutely determined.

A probable mediator of the effects of social relations at work on sleep and tiredness is thought to be the individual inability to free oneself of the distressing thoughts of work problems during leisure time.¹² Work-related stress factors, such as high job demands, low job control, and high workload, have been shown to have an association with the need for recovery, and recovery, in turn, is related to tiredness and sleep quality.⁴⁹ Similarly, low social support, as a stress factor, may adversely affect recovery and further increase tiredness and sleeping problems. Worries at bedtime or being awakened during the night because of anticipated potential negative feelings experienced in the social relationships the next day will affect sleep quality negatively.¹² Lack of social support at work may also mean lack of “buffering” resources against work stress, ie, the combination of high job demands and low job control.¹⁶ When insomnia becomes chronic it becomes a stress factor itself because it cannot be easily controlled.

In Finland and in Sweden, work-related sleeping problems increased during the 1990s.⁴ There are perhaps many reasons for this increase in Scandinavia. Shift work has increased and other untypical working hours are also more frequent in Scandinavia than in other parts of Europe.⁵⁰ Finnish and Swedish employees tend to be quite thorough and may therefore perceive their jobs more stressful. Scandinavian drinking habits are also related to increased rates of episodic insomnia.

We adjusted the primary models for many potential confounding and mediating factors such as lifestyle factors. Coffee drinking may be compensation for tiredness or it may cause a person to stay awake. Smoking and alcohol consumption may worsen sleep quality or sleeping difficulties may cause a person to smoke more or consume more alcohol. Many factors that affect sleep quality, ie, being overweight, physical activity during leisure time, having small children in the household, shift work, and perceived health, may also be related to work stress. Furthermore, we found some interactions between gender and social support associated with sleep outcomes. In line with a Swedish study, we found an association between sleeping difficulties within the previous month and social support in private life among women but not among men.²³ In our study, there was also an association between low support from coworkers and short sleep duration only among women. Men and women have been found to be vulnerable to partly different psychosocial characteristics in their work and domestic environments.⁴⁰ It has, for example, been suggested that private life events in general may affect women’s health whereas work factors are relevant regarding men’s health.⁵¹ This parallels our results concerning the associations between social support in private life and sleeping problems among women. However, social support at work seems to be equally associated with sleeping problems irrespective of gender.

The representative nature of our study sample allows a careful generalization of these findings to the Finnish workforce of older than 30 years of age. The participation rate of the Health 2000 study was high, 87% in the interview and 84% in the health examination. Non-participation did not have a large influence on our study because the non-respondents were most often unemployed men not included in our study. Our study was mostly cross-sectional, and the results are open to reversed causality. It is possible that the employees with sleeping problems perceived the received support as lower than their better sleeping coworkers, they may need more social support than their coworkers and therefore think it is insufficient, or their own behavior may have been the reason for getting lower support.

CONCLUSIONS

Low social support at work and in private life was found to relate to several forms of sleeping problems. As social support at

work and sleep are connected to each other, the question arises of whether practices that improve social support would also result in better sleep. A positive answer to this question in future studies would further support the significance of social support at work.

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Sinokki M, Hinkka K, Ahola K et al. Social support as a predictor of disability pension. The Finnish Health 2000 Study. J Occup Environ Med 2010; 52: 733–739.

Social Support as a Predictor of Disability Pension: The Finnish Health 2000 Study

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Objective: Social support at work and in private life was examined as a predictor of disability pension in the population-based Finnish Health 2000 study. **Methods:** Social support was measured in a nationally representative sample comprising of 3414 employees aged 30 to 64 years. Disability pensions extracted from the registers of the Finnish Centre for Pensions were followed up across 6 years. **Results:** Low social support from supervisors was associated with disability pension with an odds ratio of 1.70 (95% confidence interval, 1.21 to 2.38) when adjusted with sociodemographic and health behavior variables. After adjustment for baseline perceived health, the associations between supervisor support and disability pension strongly attenuated. **Conclusions:** Low social support from supervisors predicts forthcoming work disability but the relationship is affected by self-reported nonoptimal health at baseline.

Early retirement due to work disability is a significant social and economic problem in many Western countries. The costs of disability pensions are steadily growing in Europe and in the United States.¹ In addition, ageing of the working population has created a need to keep employees in the labor market as long as possible. In Finland, ~80% of employees retire before the formal age of old age pension. About 7% of the working age population of Finland was on disability pensions in 2006.²

Psychosocial factors at work may contribute to early exit from the labor market.^{3–5} Social support, in common, is an important health-related factor. Social support at work reduces work stress and increases job satisfaction. Lack of social support at work has been linked to subsequent health problems, for example cardiovascular diseases,^{6,7} risk for increase in blood pressure and heart rate,^{8,9} adverse serum lipids,¹⁰ lower back problems,¹¹ neck pain,¹² depressive and anxiety disorders,^{13–15} health effects via alteration of immunity,¹⁶ and risk of insomnia.¹⁷ To date, only few studies have focused on the association between social support and disability pension. In a population-based prospective study among 1152 occupationally active persons, the association between low private life support and disability because of lower back disorders was found but the association was weak.¹⁸ A similar weak effect was found between low general social support and disability pension in a prospective cohort study of 4177 employees in Denmark.¹⁹ Supervisor support was not significantly related to disability retirement nor was the case for coworkers' support in a prospective study among 1038 Finnish men.³ A random Danish sample of 5940

employees estimating gender difference and factors in- and outside work in relation to retirement rate showed in an unadjusted model that women with low general social support had a higher risk of disability pension.²⁰

Only few earlier studies have used a representative population-based sample, and the samples used have been small or have also included the unemployed or those outside working life. Specific scales for work-related social support have rarely been used.³ Furthermore, possible confounding factors in the association between social support and disability pension have not been consistently adjusted for.

The objective of this study was to examine whether low social support at work and in private life predicts disability pension during a 6-year follow-up period in a population-based sample of Finnish employees. Several relevant covariates, including sociodemographic factors, health behaviors, and health status at baseline were controlled for.

METHODS

Study Sample

A multidisciplinary epidemiological health survey, the Health 2000 Study, was performed in Finland between the years 2000 and 2001. The two-stage stratified cluster sample ($n = 8028$) comprised the population aged ≥ 30 years living on the Finnish mainland.^{21,22} The strata were the five university hospital districts, each serving approximately one million inhabitants and differing in several features related to health services, geography, economic structure, and the sociodemographic characteristics of the population. From each university hospital region, 16 health care districts were sampled as clusters. The 15 largest cities were all included with a probability of 1 and 65 other areas were sampled applying the probability proportional to population size method. Finally, from each of these 80 areas, a random sample of individuals was drawn from the National Population Register. Details of the methodology of the project have been published elsewhere.²¹

The participants were interviewed at home and were given a questionnaire, which they returned at a clinical health examination. The respondents received an information leaflet and their written informed consent was obtained. The study has obtained approval of the Ethics Committee of Epidemiology and Public Health in the Hospital District of Helsinki and Uusimaa. The nonrespondents were most often unemployed men or men with low income.²³

Of the total sample, 5871 were of working age (30 to 64 years). Of these, the final sample-participants were individuals who 1) participated in the home interview (5152; 87.8%), 2) returned the questionnaire (4935; 84.1%), 3) participated in the health examination (4886; 83.2%), 4) were employed (3533; 72.3%), and 5) answered all the social support measures in the questionnaire (3414; 66.3%).

Measurements

Social support was measured with self-assessment scales. The measure of social support at work was from the Job Content Questionnaire.²⁴ Separate questions assessed different forms of

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social support at work: supervisor support “When needed, my closest superior supports me” and coworker support “When needed, my fellow workers support me.” Responses were given on a 5-point scale ranging from 1 (fully agree) to 5 (fully disagree). For analyses, the alternatives 1 and 2 as well as 4 and 5 were combined to make a 3-point scale. Furthermore, the scale was reversed to give high values for good support.¹³

The measure of social support in private life was part of the Social Support Questionnaire by Sarason et al.²⁵ The scale comprised four items “On whose help can you really count when you feel exhausted and need relaxation?”, “Who do you think really cares about you no matter what happened to you?”, “Who can really make you feel better when you feel down?”, and “From whom do you get practical help when needed?” reflecting different ways of giving support. Respondents could choose one or more of six alternatives (husband, wife or partner, some other relative, close friend, close neighbor, someone else close, no one) giving support. The private life support score was formed by combining the sources giving support and the items reflecting the nature of support. The score ranged from 0 to 20. For analyses, the score was divided into tertiles (low 0 to 4, intermediate 5 to 8, and high 9 to 20). Cronbach’s α was 0.71 for the private life support.¹³

There are two complementary pension systems in Finland. Earnings-related pension is linked to past employment and the national pension is linked to residence in Finland. Disability pension may be granted to a person aged <65 years (since 2005 aged <63 years) who has a chronic illness, handicap, or injury, which reduces the person’s work ability and whose incapacity for work is expected to last for at least 1 year. Disability pension may be granted either until further notice or in the form of cash rehabilitation benefit for a specific period of time. One special form of disability pension, the individual early retirement pension, has now been disestablished, but during our study, it was possible to be granted to persons born in 1943 or earlier. The disability pensions of the participants were extracted from the records of the Finnish Centre of Pensions and the Social Insurance Institution of Finland. The participant was identified as a case if he or she had been granted a disability pension or an individual early retirement pension between January 1, 2001, and December 31, 2006.

Mental health status was assessed by a computerized version of the World Health Organization (WHO) Munich-Composite International Diagnostic Interview (M-CIDI) as a part of a comprehensive health examination at baseline. The standardized CIDI is a structured interview developed by the WHO and designed for use by trained nonpsychiatric health care professional interviewers.²⁶ It has been shown to be a valid assessment measure of common mental nonpsychotic disorders.²⁷ The program uses operationalized criteria for Diagnostic and Statistical Manual of Mental Disorders version IV (DSM-IV) diagnoses and allows the estimation of DSM-IV diagnoses for major mental disorders. A participant was identified as having a common mental disorder if he or she fulfilled the criteria for a depressive or anxiety disorder. Depressive disorders included the diagnosis of depression or dysthymic disorder during the previous 12 months and anxiety disorders included the diagnosis of panic disorder with or without agoraphobia, generalized anxiety disorder, social phobia not otherwise specified, and agoraphobia without panic disorder.¹³

Physical illnesses were diagnosed by a physician during the clinical health examination. First, a symptom interview was performed. After several measurements, the research physician took a history and performed a standard 30-minute clinical examination. The diagnostic criteria of the physical illnesses were based on current clinical practice. In this study, the participant was identified as having a physical illness if he or she fulfilled the diagnostic

criteria for musculoskeletal disorder, cardiovascular disease, respiratory disease, or other physical illness.

Sleeping difficulties were assessed with a question from the Symptom Checklist-90²⁸ of “Have you had some of the following usual symptoms and troubles within the last month: ...sleeping disorders or insomnia...?” Answers were given on a 5-point scale ranging from 1 (not at all) to 5 (very much). Alternatives 1 and 2 as well as 3, 4, and 5 were combined to make a 2-point scale.

Perceived health was measured with questions on self-reported health status. Health status was evaluated with a 5-point scale ranging from 1 (good) to 5 (poor). Alternatives 1 and 2 (perceived good health) as well as 3, 4, and 5 (perceived nonoptimal health) were combined to make a 2-point scale.

Health behaviors assessed covered smoking, high alcohol consumption, physical activity during leisure time, and body mass index (BMI). Regular smoking (yes/no) was assessed in the home interview and high alcohol consumption (average weekly consumption ≥ 190 g of absolute alcohol for women and ≥ 275 g for men)²⁹ was assessed with the questionnaire. The level of physical activity during leisure time was assessed with the questionnaire (at least 30 minutes physical activity 4 times per week or more). BMI (≥ 30 kg/m²) was calculated on the basis of the clinical measurements during the health examination.

Sociodemographic variables included age, sex, marital status, and occupational grade. Marital status was divided into two groups: those who were married or cohabiting and those who were divorced, widowed, or single. Occupational grade was formed on the basis of occupation and type of business: upper grade non-manual employees, lower grade nonmanual employees, manual workers, and self-employed.³⁰

Statistical Analyses

Descriptive statistics were presented for each variable and comparisons were made using the χ^2 or Wilcoxon test. Second, associations between social support and baseline health indicators were examined to see the potential health-related factors between social support and disability pension. Finally, sequentially adjusted logistic regression analyses were used to calculate the odds ratios and their 95% confidence intervals (CIs) for new disability pensions during the follow-up in relation to social support at work and in private life. The logistic regression analyses were adjusted for baseline covariates, health indicators, and health behaviors progressively: first age,³¹ sex,³¹ marital status,³² and occupational grade,³² then smoking,²⁰ alcohol consumption,⁵ physical activity during leisure time,⁵ and BMI.⁵ The analyses were then adjusted in turn for chronic physical illnesses, common mental disorders, and sleeping problems, and each of these analyses were finally adjusted for perceived health.⁵ Analyses regarding social support in private life were not adjusted for marital status because marital status is closely related to getting support in private life. Interaction effects between sex and social support predicting disability pensions were also tested.³¹ Sampling parameters and weighting adjustment were used in the analyses to account for the survey design complexities, including clustering in a stratified sample, and nonparticipation.^{21,23,33} The data were analyzed using SAS 9.1/SUDAAN 9. SUDAAN has been specifically designed to analyze cluster-correlated data in complex sample surveys.³⁴

RESULTS

Table 1 presents the characteristics of the study participants by sex.³¹ Women had a higher occupational grade and were more likely to be divorced, widowed, or single than men. Women reported getting more social support both at work and in private life than men. About 25% of the participants were smokers, 21% of women, and 29% of men. Almost 10% of the participants had high

TABLE 1. Characteristics of the Study Population (N = 3,414)

Characteristics	Men (N = 1,690)		Women (N = 1,724)		P
	Mean (SD)	Number (Weighted %)	Mean (SD)	Number (Weighted %)	
Age	44.1 (8.44)		44.6 (8.38)		0.061
Occupational grade					<0.0001
Higher nonmanual		464 (27.5)		503 (29.0)	
Lower nonmanual		268 (15.9)		680 (39.6)	
Manual		658 (39.2)		372 (21.8)	
Self-employed		293 (17.4)		165 (9.6)	
Marital status					0.0008
Married/cohabiting		1,360 (80.4)		1,308 (75.8)	
Single, divorced or widowed		330 (19.6)		416 (24.2)	
Social support at work (1–5)	3.84 (0.97)		3.97 (0.91)		<0.0001
From supervisor					0.001
Low		301 (17.8)		256 (14.9)	
Intermediate		278 (16.5)		233 (13.5)	
High		1,111 (65.7)		1,235 (71.5)	
From co-workers					0.020
Low		122 (7.3)		113 (6.6)	
Intermediate		210 (12.4)		165 (9.5)	
High		1,358 (80.3)		1,446 (83.9)	
Social support in private life (0–20)	6.33 (2.94)		7.39 (2.99)		<0.0001
Low		638 (37.8)		382 (22.5)	
Intermediate		703 (41.5)		785 (45.5)	
High		349 (20.7)		557 (32.0)	
Smoking					<0.0001
No		1,201 (71.0)		1,362 (79.2)	
Yes		489 (29.0)		361 (20.8)	
High alcohol consumption*					<0.0001
No		1,445 (85.5)		1,654 (96.0)	
Yes		244 (14.5)		69 (4.0)	
High BMI†					0.619
No		1,381 (81.7)		1,402 (81.1)	
Yes		307 (18.3)		321 (18.9)	
Physical activity‡					0.0007
Yes		318 (18.8)		401 (23.3)	
No		1,371 (81.2)		1,317 (76.7)	
Physical illnesses§					0.0176
No		759 (45.4)		711 (41.4)	
Yes		904 (54.6)		987 (58.6)	
Depressive or anxiety disorder					<0.0001
No		1,522 (93.8)		1,465 (88.4)	
Yes		102 (6.3)		194 (11.6)	
Sleeping difficulties					0.0005
No		1,271 (75.2)		1,208 (69.8)	
Yes		416 (24.8)		514 (30.2)	
Perceived nonoptimal health					0.0207
No		1,260 (74.5)		1,356 (78.2)	
Yes		429 (25.5)		368 (21.8)	
Disability pension¶					0.185
No		1,571 (92.9)		1,586 (91.7)	
Yes		119 (7.1)		138 (8.4)	

*Average weekly consumption ≥ 190 g of absolute alcohol for women and ≥ 275 g for men.

†BMI ≥ 30 kg/m².

‡Physical activity during leisure time four times per week or more.

§Physical illnesses diagnosed by physician during the clinical health examination.

||Depressive or anxiety disorder assessed by a computerized version of the WHO CIDL.

¶Disability pensions extracted from the register of the Finnish Centre for Pensions.

TABLE 2. OR and 95% CI for Illnesses by the Level and Source of Social Support

	Physical Illnesses		Mental Disorders		Sleeping Difficulties		Perceived Nonoptimal Health	
	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)
Support from supervisor	0.052		<0.0001		<0.0001		<0.0001	
Low		1.21 (1.01–1.46)		2.16 (1.63–2.88)		1.86 (1.53–2.27)		2.18 (1.80–2.65)
Intermediate		0.92 (0.76–1.14)		1.54 (1.12–2.12)		1.51 (1.23–1.86)		1.52 (1.21–1.89)
High		1.00		1.00		1.00		1.00
Support from co-workers	0.004		<0.0001		<0.0001		<0.0001	
Low		1.25 (0.96–1.61)		2.03 (1.39–2.97)		1.98 (1.50–2.61)		1.87 (1.44–2.42)
Intermediate		1.38 (1.12–1.71)		2.00 (1.45–2.75)		1.52 (1.20–1.93)		1.59 (1.27–2.00)
High		1.00		1.00		1.00		1.00
Support in private life	0.009		0.063		<0.0001		<0.0001	
Low		1.27 (1.06–1.52)		1.51 (1.07–2.14)		1.49 (1.22–1.81)		2.25 (1.80–2.83)
Intermediate		1.02 (0.85–1.22)		1.37 (0.98–1.92)		1.08 (0.87–1.33)		1.44 (1.16–1.77)
High		1.00		1.00		1.00		1.00

Illnesses and support at baseline without covariates.
OR, odds ratios.

alcohol consumption, 4% of women, and 15% of men. BMI was 30 or higher in 19% of the participants. Nearly, 20% of the participants took physical exercise during leisure time four or more times per week. About 57% of the participants suffered from some physical illnesses, 9% from depressive or anxiety disorder, and 27% from sleeping difficulties. Altogether 24% of the participants perceived their health average or poor.

The associations of social support with potential mediators (physical and mental health status, sleeping difficulties, and perceived health at baseline) are shown in Table 2. The associations of low social support with all these health indicators were significant except that between low support from coworkers and physical illnesses. The data were reanalyzed with perceived health as a three-category variable. This analysis replicated the original findings. There were only 123 participants who perceived their health as poor and 674 participants who perceived their health as average.

Altogether, 257 persons (7.5%) were granted a disability pension during the 6-year follow-up. Table 3 presents the associations for disability pension by the level and source of social support. Low social support from supervisors was associated with subsequent disability pension in the model without covariates. The odds related to being granted a disability pension with low support from supervisors was 1.44 (95% CI, 1.03 to 2.01). The association between low supervisor support and disability pension remained significant after adjustment for sociodemographic factors, health behaviors, and either physical illnesses, mental disorders or sleeping problems. However, after adjustment for perceived health, the association between social support from supervisor and disability pension attenuated and failed to reach significance.

Low social support from coworkers was related to 1.56-fold odds of subsequent disability pension (95% CI, 1.01 to 2.49) compared with high support in an unadjusted model. Low social support in private life was related to 1.94-fold odds of subsequent disability pension (95% CI, 1.35 to 2.78) compared with high support in an unadjusted model. However, after adjustment for sociodemographic factors, neither of these associations remained statistically significant (Table 3). No interaction effect between sex and social support was found for subsequent disability pensions.

To examine whether there was bias because of a shorter follow-up time among the oldest participants, we reanalyzed our data by excluding the participants who were ≥ 60 years at baseline. This subgroup analysis replicated the original findings.

DISCUSSION

This nationally representative 6-year follow-up study of Finnish employees showed that low social support from supervisors was associated with subsequent disability pensions. Low social support from supervisors predicted work disability but the relationship was affected by self-reported nonoptimal health at baseline. Social support from coworkers and in private life did not predict future disability pension after the sociodemographic characteristics of the participants were taken into account.

The scarce earlier studies have shown only weak associations^{3,19,35} between low social support and disability pensions or that found only among women.²⁰ In our study, the association found between social support from supervisor and disability pension can be explained, for example, by social support at work as a buffer between work stress and its negative consequences.^{36,37} Social support may also influence attitudes directly. Some studies on stress reduction state that social support may act as a critical factor between psychosocial stressors and severe health impairment.^{38,36}

Disability pension is granted for medical reasons. According to our study, perceived health rather than somatic or mental disease status at baseline is a predictor of disability pension. We found a large reduction in the odds ratios between supervisor social support and disability pension after adjustment for perceived health status. Perceived health status may be a proxy for an individual's working capacity,³⁷ which, in turn, is a strong predictor of disability pension over and above the specific diagnosis or illness.^{39,40} Our results suggest that the effect of social support from supervisors on future disability pension is mediated by an employee's perceptions of health status. On the one hand, a poor relationship with a supervisor may have had negative consequences on employee health, which, in turn, may contribute to future work disability. Social support may also affect psychological recovery, which has been found to have an effect on perceived health.⁴¹ Nevertheless, baseline association between perceived nonoptimal health and social support may reflect reverse causality; perceived nonoptimal health may change the employee's behavior and lead to decreasing social support or make employees evaluate social support as being low. Because our baseline assessment was cross sectional, we were not able to test the direction of causality in this association.

Depression has been found to be an important single factor leading to disability pension. Depressed persons retire on a disabil-

TABLE 3. OR and 95% CI for Disability Pensions by the Level and Source of Social Support

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4a OR (95% CI)	Model 5a OR (95% CI)	Model 6a OR (95% CI)	Model 4b OR (95% CI)	Model 5b OR (95% CI)	Model 6b OR (95% CI)
Support from supervisor	<i>P</i> = 0.057	<i>P</i> = 0.003	<i>P</i> = 0.005	<i>P</i> = 0.020	<i>P</i> = 0.020	<i>P</i> = 0.039	<i>P</i> = 0.131	<i>P</i> = 0.125	<i>P</i> = 0.186
Low	1.44 (1.03–2.01)	1.72 (1.24–2.40)	1.70 (1.21–2.38)	1.55 (1.10–2.19)	1.56 (1.09–2.24)	1.49 (1.05–2.11)	1.29 (0.91–1.83)	1.27 (0.88–1.83)	1.25 (0.88–1.78)
Intermediate	0.86 (0.57–1.31)	0.92 (0.59–1.44)	0.91 (0.58–1.42)	0.86 (0.55–1.34)	0.83 (0.53–1.30)	0.86 (0.54–1.37)	0.77 (0.49–1.21)	0.74 (0.46–1.18)	0.78 (0.49–1.24)
High	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Support from co-workers	<i>P</i> = 0.142	<i>P</i> = 0.288	<i>P</i> = 0.350	<i>P</i> = 0.585	<i>P</i> = 0.630	<i>P</i> = 0.648	<i>P</i> = 0.899	<i>P</i> = 0.931	<i>P</i> = 0.932
Low	1.56 (1.01–2.49)	1.38 (0.87–2.18)	1.35 (0.86–2.14)	1.27 (0.79–2.05)	1.26 (0.76–2.10)	1.19 (0.76–1.87)	1.12 (0.69–1.80)	1.10 (0.66–1.83)	1.06 (0.67–1.67)
Intermediate	1.22 (0.81–1.85)	1.20 (0.81–1.78)	1.20 (0.81–1.78)	1.08 (0.72–1.63)	1.09 (0.73–1.64)	1.12 (0.76–1.66)	1.02 (0.67–1.57)	1.00 (0.65–1.53)	1.07 (0.71–1.61)
High	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Support in private life	<i>P</i> < 0.0001	<i>P</i> = 0.187	<i>P</i> = 0.169	<i>P</i> = 0.228	<i>P</i> = 0.219	<i>P</i> = 0.413	<i>P</i> = 0.317	<i>P</i> = 0.250	<i>P</i> = 0.442
Low	1.94 (1.35–2.78)	1.24 (0.88–1.75)	1.20 (0.85–1.71)	1.25 (0.88–1.78)	1.25 (0.87–1.81)	1.14 (0.80–1.61)	1.13 (0.79–1.62)	1.12 (0.77–1.65)	1.05 (0.74–1.51)
Intermediate	1.11 (0.76–1.60)	0.93 (0.65–1.32)	0.92 (0.64–1.32)	0.97 (0.67–1.40)	0.95 (0.66–1.37)	0.91 (0.64–1.31)	0.88 (0.60–1.29)	0.85 (0.58–1.25)	0.85 (0.59–1.25)
High	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Model 1: without covariates.
 Model 2: adjusted for sociodemographic variables (age, sex, marital status, and occupational grade).
 Model 3: adjusted for sociodemographic and health behavior variables (physical activity, BMI, alcohol consumption, and smoking).
 Model 4a: adjusted for sociodemographic and health behavior variables and physical illnesses.
 Model 5a: adjusted for sociodemographic and health behavior variables and mental disorders.
 Model 6a: adjusted for sociodemographic and health behavior variables and sleeping difficulties.
 Model 4b: adjusted for sociodemographic and health behavior variables, physical illnesses, and perceived health.
 Model 5b: adjusted for sociodemographic and health behavior variables, mental disorders, and perceived health.
 Model 6b: adjusted for sociodemographic and health behavior variables, sleeping difficulties, and perceived health.
 OR, odds ratios.

ity pension on average 1.5 years earlier than those without depression.⁴² In our study, we controlled mental health at baseline, but the association between social support and work disability persisted after adjustment for baseline mental health. Insomnia is associated with significant health problems, morbidity, and work absenteeism in many studies.^{43–45} In our study, we found an association between social support and disability pensions in the model adjusted with sociodemographic, health behavior variables, and sleeping difficulties, thus suggesting that sleeping problems are not a major confounder or mediator between social support and disability pension.

Nonparticipation did not have a large influence on our study because the nonrespondents were most often unemployed men not included in our study.²³ However, participation in health surveys, in common, is usually markedly lower among people with severe mental health problems. This fact may introduce bias into the study and impact on the generalizability.

Study Strengths and Weaknesses

The specific strength of this study was the population-based data with a high participation rate. Disability pensions were taken from the register covering all disability pensions in Finland and thus no individuals were lost to follow-up. Furthermore, the results were controlled for a number of potential and previously known confounding and mediating factors. Mental health status at baseline was assessed by standardized CIDI interview and physical illnesses were assessed by a physician at a standard 30-minute clinical examination.

Social support was measured with self-assessment scales at one point in time only. The wording of the scales of support at work and in private life differed to a certain extent and there is a possibility that they indicated the phenomenon in a slightly different way. The oldest participants in our study had a shorter follow-up time than 6 years but the results were similar among persons aged <60 years. Disability pensions are rare events and the granting processes are long. In Finland, disability pensions are usually preceded by sickness absence benefit for 300 days. During the 6-year follow-up of our study, the 257 cases of disability pensions granted covered 7.5% of the sample. A longer follow-up time would have increased the number of pensions but in such a time, the baseline social support situation could also have changed and the association diluted. However, the present prospective design established a clear temporal relationship between the predictors and the outcome necessary for a causal interpretation.

Policy Implications

Social support at work should be taken into account as a potential psychosocial factor contributing to health status and working capacity of employees.

CONCLUSIONS

Low social support from supervisors predicts employees' future disability pension but the relationship is affected by self-reported nonoptimal health at baseline.

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