

Pirjo Lindfors

Work-related well-being of Finnish anesthesiologists



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*To thine own self be true. And it must follow, as the night the day.
Thou canst not be false to any man.*

Shakespeare. Hamlet. Act 1, Scene 3.

To my mother Helvi, my daughter Sonya,
and to the memory of my father Lande

ABSTRACT

Background

Anesthesiologists have been, according to some studies, dying at a significantly earlier age than their colleagues and the general population. They have also been among the leaders among physicians in suicide records. Some studies point out that they are highly stressed. Others link their stress to time constraints, on-call duty, and organization. The knowledge is, however, sparse and contradictory. Structural changes with fusions, layoffs, breakup of teams, change in work units, together with business thinking, split care, and the economic crises may have worsened their stress experience. The on-call burden of the anesthesiologists is known to be high. Several studies have indicated the deleterious effects of sleep deprivation. However, on-call stress and related ill-health has hardly been studied.

Aims

The aim of this study was to discover details of the work-related well-being of Finnish anesthesiologists, with stress levels, stressors, on-call stress, burnout, and suicidality examined. The level and determinants of job satisfaction, work ability, and life satisfaction were examined by gender. The willingness of the anesthesiologists to change employment, and work-related, individual, and family-related factors associated with this, were also topics. The main focus was on the associations of on-call duty, organizational justice, job control, and workplace atmosphere with the anesthesiologists' well-being. The study questions were approached in a multi-facultative manner in order to gain a more complete and holistic understanding of this well-being.

Methods

In 2004, a double mail-out postal survey including all working Finnish anesthesiologists, (N = 550) was carried out. A total of 328 (60%) responded; 53% were men. The questions comprised items on their characteristics, work environment, stress and burnout, being on-call and well-being, life quality, job satisfaction, work ability, self-rated health, health behavior, psycho-social support, and retirement. Some open anesthesia-specific questions were included. Each respondent was also given the opportunity to add free narrative comments.

Results

In comparison to earlier data, the anesthesiologists had the greatest on-call workload among Finnish physicians. In this study, 68% felt stressed. The most important causes of stress were work and combining work with family life. Their main worries at work were: excessive workload and time constraints, especially being on call, organizational problems, and fear of harming patients. Burnout correlated with on-call workload. Being frequently on call was correlated with severe stress symptoms. These symptoms were associated with sick leaves. Women were more affected by stress than were men. The higher the levels of job control or organizational justice, the lower the number of symptoms among those having hospital calls. Diminishing on-call frequency, shortening the on-call period, requiring two days off per week, and setting an age-limit for on-call-duty obligation were suggestions to reduce the on-call stress.

The respondents enjoyed fairly high job satisfaction, work ability, and life satisfaction. Job control and organizational justice were the most important correlates of these wellness indicators. Work-related factors were slightly more important correlates of well-being in males, whereas family life seemed to play a larger role in the well-being of female anesthesiologists. Women had less job control, fewer permanent job contracts, and a higher domestic workload.

Of the respondents, 31% were willing to consider changing to another physician's specialty and 43% to a profession other than medicine. The most important correlates for these job turnover attitudes were conflicts with superiors and co-workers, low job control, organizational injustice, stress, and job dissatisfaction.

ABSTRACT

One in four had at some time considered suicide. Respondents with poor health, low social support, and family problems were at the highest risk for suicidality. The highest risks at work were conflicts with co-workers and superiors, on-call-related stress symptoms, and low organizational justice. If a respondent had several risk factors, the risk for suicidality doubled with each additional factor.

Conclusions

On-call work-burden, job control, fairness of decision-making procedures, and interpersonal relationships should be the focus in aiming to increase work-related well-being of anesthesiologists.

Keywords: anesthesiologist, physician, stress, on call-duty, workload, stress symptoms, burnout, sleep, gender, suicidality, sick leave, job satisfaction, work ability, life satisfaction, job control, organizational justice, health, social support, family problems, job turnover, conflicts at work

Summary in Finnish – Tiivistelmä

SUOMALAISTEN ANESTESIALÄÄKÄRIEN TYÖHÖN LIITTYVÄ HYVINVOINTI

Tutkimuksen taustaa

Anestesia­lääkärit ovat kuolleet eräiden tutkimusten mukaan muita lää­käreitä ja muuta väestöä nuorempina. Lääkärit tekevät huomattavasti yleisväestöä enemmän itsemurhia – ja anestesia­lääkärit ovat olleet lääkärien itsemurhatilastojen kärjessä. Eräiden tutkimusten mukaan anestesia­lääkärit ovat hyvin stressaantuneita. Heidän stressinsä näyttäisi liittyvän kiireeseen, päi­vystämiseen ja työorganisaatioon liittyviin ongelmiin. Aiempien tutkimusten tulokset anestesia­lääkärien stressistä, stressin syistä ja seurauksista ovat osittain ristiriitaisia.

Tulosvastuu-ajattelu ja terveydenhuolto-organisaatioiden rakenne­muutokset – joissa johtaja ja johtamistapa muuttuvat, työtiimit hajoavat, työpaikka ja työnkuva muuttuvat, osa toimijoista ulkoistetaan, irtisa­nomiset uhkaavat, palkkauksen peruste muuttuu ja potilas-lääkärisuhteet heikentyvät – laittanevat oikeudenmukaisuuden kokemuksen ja työn hallinnan koetukselle: anestesia­lääkäri­n stressi lisääntyy.

Anestesia­lääkärien päi­vystysrasituksen tiedetään olevan suuren. Yötyöntekijöistä tehdyt tutkimukset osoittavat, että unen puute on yhteydessä vakaviin sairauksiin ja jopa ennenaikaiseen kuolemaan. Päi­vys­tamisen vaikutusta lääkäri­n subjektiiviseen vointiin ja sairastavuuteen ei ole juurikaan tutkittu.

Tavoitteet

Väitöskirjatyössäni pyrin selvittämään anestesiaalääkäreiden työhön liittyvää subjektiivista vointia ja siihen vaikuttavia tekijöitä. Tavoitteena oli selvittää heidän stressitasojaan, stressin lähteitä – etenkin päivystämistä ja siihen liittyvää burnoutia ja stressioireilua – sekä stressiltä suojaavia tekijöitä. Lisäksi tavoitteena oli selvittää työtyytyväisyyttä, -kykyä ja elämään tyytyväisyyttä ja niihin liittyviä tekijöitä sukupuolispesifisti. Pyrkimyksenä oli myös selvittää työn vaihtamishalukkuutta joko muuhun lääkärin ammattiin tai kokonaan muuhun ammattiin. Stressioireiluun liittyvänä selvitettiin erikseen suisidaalisuutta ja siihen vaikuttavia tekijöitä. Päätehtävänä oli selvittää päivystysrasituksen ja siltä suojaavien tekijöiden sekä organisaation oikeudenmukaisuuden, ammatillisen itsemääräämisoikeuden ja työpaikan ihmissuhteiden vaikutusta anestesiaalääkärin vointiin. Tutkimusongelmaa lähestyttiin poikkitieteellisesti sekä lääketieteen, psykologian, sosiologian että antropologian näkökulmista tavoitteena saada aikaisempia tutkimuksia kokonaisvaltaisempi näkemys asiasta.

Metodit

Tutkimusaineisto koottiin postikyselyllä keväällä ja syksyllä 2004. Tutkimukseen otettiin kaikki Suomessa työskentelevät anestesiaerikoislääkärit (N = 550). Kahden kyselykierroksen jälkeen 60 % heistä (328) vastasi. Vastajista 53 % oli miehiä. Kysely perustui entuudestaan tunnettuihin kansainvälisiin ja suomalaisiin kysymyspatteristoihin, etenkin niihin, joita käytettiin ”Lääkärin työ ja kuormittuneisuus” -tutkimuksessa vuonna 1997. Kyselylomake sisälsi pääosin strukturoituja kysymyksiä demografisista tiedoista, työympäristöstä, stressistä ja burnoutista, päivystämisestä ja hyvinvoinnista, elämänlaadusta, työtyytyväisyydestä ja työkyvystä, terveydestä, terveyskäyttäytymisestä, psykososiaalisesta tuesta ja eläköitymistavoista. Lisäksi esitettiin muutama tätä tutkimusta varten luotu strukturoitu ja avoin kysymys etenkin päivystämisen vaikutuksen tutkimiseksi. Kullakin vastaajalla oli myös mahdollisuus kirjoittaa vapaasti kyselyyn liittyviä kommentteja.

Tulokset

Anestesia- ja lääkäri-ammattilaisilla on suomalaisista lääkäreistä suurin päivystystaakka. Yli kaksi kolmasosaa vastanneista koki olevansa stressaantunut. Suurimmat stressin syyt olivat työ ja työn ja perheen yhteen sovittaminen. Työssä eniten huolestuttivat kiire ja työn määrä etenkin päivystyksessä, organisaatioon liittyvät ongelmat sekä pelko potilaan vahingoittamisesta. Rungas päivystäminen oli yhteydessä jopa vakavaan stressioireiluun, joka puolestaan liittyi sairauslomalla oloon. Naiset kärsivät stressioireilusta merkitsevästi miehiä enemmän. Päivystysstressin lieventämiseksi vastaajat ehdottivat päivystyskertojen vähentämistä ja päivystysrupeaman lyhentämistä (12 tai 17 tuntiin) sekä pakollista kahden päivän viikkovapaata ja yläikärajan (50 vuotta) asettamista päivystyspakolle. Mitä paremmaksi työn hallinta ja organisaation oikeudenmukaisuus koettiin, sitä vähemmän päivystysstressioireilua ilmeni raskaissa sairaalapäivystyksissä.

Anestesiaerikoislääkärit olivat huolimatta stressaantuneisuudestaan melko tyytyväisiä työhönsä ja elämäänsä ja omasivat melko hyvän työkyvyn. Oman työn hallinta ja organisaation oikeudenmukaisuus olivat tärkeimmät tekijät työhön liittyvässä hyvinvoinnissa. Työhön liittyvät tekijät olivat tärkeämpiä miehillä kuin naisilla, kun taas perhe-elämä oli tärkeämpää naisten hyvinvoinnille. Naisilla oli miehiä vähemmän mahdollisuutta hallita työtään, vähemmän pysyviä työsuhteita, mutta enemmän kotitöitä.

Lähes kolmannes vastaajista oli halukkaita harkitsemaan ammattinsa vaihtamista toiseen lääkärin ammattiin ja 43 % muuhun kuin lääkärin ammattiin. Tärkeimmät tällaiseen suhtautumiseen vaikuttavista tekijöistä olivat konfliktit työyhteisössä, huono työn hallinta, organisaation epäoikeudenmukaisuus, stressi ja tyytymättömyys työhön.

Neljäsosa vastaajista raportoi harkinneensa joskus itsemurhan tekoa. Suurimmat riskit suusidaalisuudelle olivat huono terveys, vähäinen sosiaalinen tuki ja perhe-ongelmat. Työhön liittyvistä riskeistä suurimmat olivat konfliktit työyhteisössä, päivystysstressi ja organisaation epäoikeudenmukaisuus. Riskitekijöiden kumuloiduessa riski kaksinkertaistui jokaisen uuden tekijän myötä.

Johtopäätökset

Anestesiologien työkuormittuneisuus on suuri, kun indikaattoreina käytetään stressitasoja, päivystysrasitusta ja siihen liittyvää stressioireilua, burnoutia, sairauspoissaoloja, univajetta, itsemurha-ajattelua ja heikkoa työhön sitoutumista. Siitä huolimatta he ovat melko tyytyväisiä työhönsä ja elämäänsä ja omaavat melko hyvän työkyvyn. Vaikuttaa siis siltä, että itse työn sisältö on heille voimavara.

Naisten työtilanne on miehiä epäedullisempi, ja he ovat miehiä kuormittuneempia. Heillä perheeseen liittyvät työhyvinvointiin vaikuttavat tekijät ovat tärkeämpiä kuin miehillä.

Tunne organisaation oikeudenmukaisuudesta ja hyvästä itsemääräämisoikeudesta työssä vaikuttaisi lieventävän päivystämiseen liittyviä stressioireita.

Haluttaessa kohentaa anestesia-ääkäreiden työhön liittyvää hyvinvointia tulisi tämän väitöskirjatyön perusteella keskittyä vähentämään päivystysrasitetta, lisäämään ammatillista itsemääräämisoikeutta ja organisaation oikeudenmukaisuutta sekä parantamaan työpaikan ihmissuhteita.

Väitöskirjan lopussa esitetään osoitettuihin epäkohtiin liittyviä parannusehdotuksia ja jatkotutkimussuosituksia.

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The idea for this work came from my own experiences in anesthesiologist's work in Finland and in Barbados. Listening to Professor Torsten Gordh's presentation about short life expectancies among Swedish anesthesiologists convinced me that my experience in the field was not exceptional, and it was worth investigating the well-being and possible causes of ill-health among anesthesiologists. I want to thank him for that.

First I had to find supervisors that would be interested in my idea, and would have the capacity, time, and strength to supervise me during the following years. By that time I was working as an anesthesiologist and a pain consultant at Helsinki University Central Hospital. I was also studying cognitive behavioral therapy and medical and psychological anthropology. Together with the help of Docent Anna Maria Viljanen from the Department of Social and Cultural Anthropology and Professor Kaj Husman from the Finnish Institute of Occupational Health, I started to look for researchers who would be interested in this study idea.

It took two years without funding to plan the questionnaire. In autumn 2004 I received a year's funding for this study from the Finnish Work Environment Fund. Since then I have been working more actively with the thesis, however, working part time, since I did not dare to risk my new, interesting jobs. Nowadays I work most of the time as a pain consultant at the Hospital of Länsi-Uusimaa and at Kanta-Häme Central Hospital where I have also started a pain study project. In addition, I have been running two voluntary development projects with Cuba and Burkina Faso. These other projects may explain why the thesis work has taken such a long time.

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Espoo, 17th of February, 2010

Pirjo Lindfors

ABBREVIATIONS

| | |
|-----------|--|
| CI | Confidence interval |
| DC-model | Demand-Control theory of Karasek |
| GAS | General adaptation syndrome of Selye |
| MBI | Maslach Burnout Inventory |
| MBI-HSS | Maslach Burnout Inventory-Human Services Survey |
| MOS | Medical Outcomes Study on Social Support of Sherbourne |
| N | Number of participants |
| OR | Odds ratio |
| SD | Standard deviation |
| SOC | Sense of coherence of Antonovsky |
| <i>vs</i> | versus |

LIST OF ORIGINAL PUBLICATIONS

The thesis is based partially on unpublished results and, for the most part, on the following original publications, referred to in the text by their Roman numerals (I–V):

- I Lindfors P.M, Nurmi K, Meretoja OA, Luukkonen RA, Leino TJ, Viljanen A-M, Härmä M. On-call stress among Finnish anaesthetists. *Anaesthesia* 2006; 61:856–866.
- II Lindfors PM, Meretoja OA, Töyry SM, Luukkonen RA, Elovainio MJ, Leino TJ. Job satisfaction, work ability and life satisfaction among Finnish anaesthesiologists. *Acta Anaesthesiol Scand* 2007; 51:815–22.
- III Lindfors PM, Meretoja OA, Luukkonen RA, Elovainio MJ, Leino TJ. Attitudes to job turnover among Finnish anaesthetists. *Occup Med (Lond)* 2009; 59:126–9.
- IV Lindfors PM, Meretoja OA, Luukkonen RA, Elovainio MJ, Leino TJ. Suicidality among Finnish anesthesiologists. *Acta Anaesthesiol Scand* 2009; 53:1027–35.
- V Lindfors PM, Heponiemi T, Meretoja OA, Leino TJ, Elovainio MJ. Mitigating on-call symptoms through organizational justice and job control – A cross-sectional questionnaire study among Finnish anesthesiologists. *Acta Anaesthesiol Scand* 2009; 53:1138–44.

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1 INTRODUCTION

Although people in general do not live as long as do most physicians (Töyry 2005), anesthesiologists seem to be an exception. Studies show, internationally, that they appear to die earlier than do other physicians (Wright and Roberts 1996, Khaw 1997, Svärdsudd et al. 2002). Among physicians, their stress levels are greater – as are surgeons' (Payne and Rick 1986, Cooper et al. 1999). Compared to surgeons, however, the momentary stress of anesthesiologists is higher (Payne and Rick 1986). Their on-call burden is high, and many continue – unlike most other specialists – up until retirement on an on-call rota (Saunders 2006). Stress from being on call may stem from sleep deprivation, time constraints, lack of possibilities for consultation, the danger of harming patients, the unpredictability of emergency cases, and an unfamiliar work environment (Nicol and Botterill 2004). Before the patient is in the hands of other specialists, it is the anesthesiologist who must keep the patient alive. This often requires quick decisions and skillful, risky procedures. Sleep deprivation alone can lead to higher accident risk, stress-related diseases, and even death at an earlier age from cancer or cardiovascular problems (Meier-Ewert et al. 2004, Dembe et al. 2005, Dinges et al. 2005, Megdal et al. 2005, Van Cauter 2005). Add to this the other causes of on-call stress, all contribute to negative health effects from sleep deprivation.

Until recently, anesthesiologists have been merely surgeons' assistants with limited control over their work. Other pressures come from fusions, layoffs, break-up of teams, altered work units, faceless leaders, and economic goal seeking, together with economic crises, which further threaten to overburden the anesthesiologist (Jackson 1999, Kalimo et al. 2003b, Shanafelt et al. 2003, Vahtera et al. 2004, Cole and Carlin 2009, Wallace et al. 2009). Finland has seen more women (45%) (Suomen

Lääkäriliitto 2009) than before choose to work as anesthesiologists, meaning that work and being on call may conflict with family life, more than is usually the case among men.

Compared with other professionals and the general population, physicians have more frequently committed suicide (Lindeman 1997, Schernhammer and Colditz 2004, Wallace et al. 2009). Among physicians, one of the highest for suicide risk have been anesthesiologists (Lew 1979, Seeley 1996, Jackson 1999, Hem et al. 2000, Alexander et al. 2000, Hawton et al. 2001, Ohtonen 2002, Schernhammer 2005).

Knowledge of anesthesiologists' work-related well-being is sparse and contradictory: anesthesiologists have been shown to have higher stress levels than do other physicians (Dickson 1996), and the reasons for their stress have been related to organization and being on call (Cooper 1999). However, according to other studies their burnout levels are lower than those of other physicians, and their job satisfaction is quite good (Kluger et al. 2003).

These somewhat conflicting facts challenged us to study the well-being of anesthesiologists as members of one medical specialty experiencing high work strain.

2 AIMS OF THE STUDY

The general aim of this study was to investigate the level of and factors related to the subjective work-related well-being and health of Finnish anesthesiologists.

The more particular aims were to discover

1. stress and burnout levels and the reasons for stress; the on-call burden and possible related stress symptoms; and amount of sleep, perceived sleep deprivation, and sick leave, and their relationship to on-call stress (I)
2. levels and work-, individual-, and family-related determinants of job satisfaction, work ability and life satisfaction; possible gender differences in the determinants and the outcomes (II)
3. attitudes toward changing one's job to another physician's job or profession other than medicine; and work-related, individual, and family-related correlates of job turnover (III)
4. levels and work-, individual-, and family-related risk-factors for suicidality and the effect of accumulation of risk factors on risk for suicidality (IV)
5. whether high organizational justice, job control, and social support can protect against the negative effects of on-call stress (V)

3 CONCEPTUAL BACKGROUND

3.1 Holistic and multidimensional view of well-being and health

In this study, the well-being of an individual is understood as the net effect of positive and negative bio-psycho-socio-cultural factors. The human mind and body are understood holistically without a dualistic division into psychological or physical. This understanding is supported by studies during the latest decade using brain imaging and electron microscopy that show that mental phenomena correlate with neuro-chemical changes and vice versa. However, for technical reasons the study variables are categorized as physical, mental, social, and cultural.

Some definitions of health and related well-being are the following:

1. Health, according to the World Health Organization (WHO 1948), is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. This ideal state is, however, unrealistic to attain, and can only be aimed at.
2. Antonovsky (1979) introduced a “salutogenetic orientation” toward health, *sense of coherence* (SOC), according to which a person’s health is determined to a great extent by how he or she experiences the world as meaningful, comprehensible, and manageable. This can be seen as a paradigm shift in health discourse from a disease-centered model of pathogenesis to a resource-oriented salutogenesis aimed at prevention (Bengel et al. 1999). SOC accords with the holistic view of health: It encourages an individual to strengthen the healthy aspects of his/her organism even when suffering symptoms of illness. It also emphasizes the importance of culture – especially morals,

ethics, and norms – for well-being and health: Acting against one's value system might affect one's health.

3. The statistical norm of health is determined by the frequency of a characteristic of the organism: deviations from average values are considered to indicate disease (Bengel et al. 1999).
4. Health can also be understood as a functional norm: the person's ability to fulfill his/her role in society (Erben et al. 1989). A purely Western medical perspective neglects important dimensions of the individual's condition, such as the ability to perform and work, and life satisfaction and well-being.

In this study, health is understood as a multidimensional concept including positive body feeling, absence of complaints or signs of disease; joy, happiness, job and life satisfaction, performance, self-realization and sense of meaningfulness. Health depends on the existence and on the perception of stress and strain and on the means of dealing with it (Bengel et al. 1999).

3.2 Load – stress – strain

The concept of “stress” is complicated, with differing definitions. The first studies on stress were based on physiology, but since the 1950s different psychological models have emerged.

3.2.1 Stimulus-based approach

The word “stress” comes from the Latin word *stringere*, draw tight. Definitions of strain and load used in physics came to express how stress affects individuals. According to this model, external forces (load) are seen as exerting pressure upon an individual, producing strain (Arnold et al. 1995).

3.2.2 Response-based approach

A second concept defines stress as a person's response to a disturbance. Cannon (1930) studied the fight or flight reaction in animals and humans and observed that these subjects – in cold, lack of oxygen and excite-

ment – excreted adrenalin. He described these individuals as being “under stress.” Selye (1946) created the concept of stress: a situation where a person feels tense, anxious, nervous, restless, and has difficulties in sleeping since stressful things are so troublesome. He described a general adaptation syndrome (GAS) which describes three chronologic stages of response in a prolonged activation of *stressors*. As he describes them: 1. *Alarm reaction*: lowered resistance followed by a counter-shock during which the defense mechanisms become active. 2. *Resistance*: the stage of maximum adaptation and, hopefully, successful return to equilibrium for the individual. 3. *Exhaustion*: when adaptive mechanisms collapse. Later, Selye (1974) separated the concept of distress from good stress (eustress): An appropriate amount of stress is needed for the well-being of the organism. During optimal stress, alertness and awareness improve as well as many life functions, and physiological mechanisms that increase the sensation of well-being become activated.

3.2.3 Interactional approach

Newer theories emphasize the interaction between a person and his or her environment. In Cummings and Cooper’s (1979) *cybernetic* framework for occupational stress, the focus is on the stress cycle, “the sequential events that represent the continuous interaction between person and environment.” According to this, individuals try to keep their thoughts, emotions, and relationships in a steady state. There is a range of stability (homeostasis) in which the individuals feel comfortable. When this stability is disrupted, the individual has to make adjustments or activate coping strategies in order to maintain or achieve the stability again. Stress, according to them, is any *force* that pushes a psychological or physical factor beyond its range of stability, producing a strain within the individual. In Caplan’s *person and environment fit* model (1987) the focus is on the degree the employee’s skills, needs, and expectations match the employer’s requirements and provisions.

3.2.4 Transactional approach

In Lazarus’s transactional approach, stress can be understood as a process: a mis-fit between an individual and his particular environment

(Lazarus and Folkman 1984). Individuals, according to this theory, make a cognitive evaluation of threats that come from the environment. The degree to which people evaluate stress as a serious threat reveals the level of their perceived stress. In this model more emphasis is placed on individual differences than in the interactive models.

Most studies on work stress have considered the following factors in their theoretical framework: the presence of stressors, the evaluation process, and the response. However, there is still no consensus as to the definition of stress, nor as to the work stress process. What is most essential concerning the stress response is not the potential stressor, but how we perceive and handle the stressors (Jackson 1999).

3.2.5 Allostasis and allostatic load

Adaptation in stressful situations involves activation of neuro-immuno-endocrinological mechanisms. This adaptation, according to Sterling and Eyer (1988), is called “allostasis”, meaning that an organism has regained a new stability through change. Allostasis is essential in maintaining homeostasis. When these adaptive systems are turned on and off efficiently and not too frequently, the body is able to cope effectively with stressors that it might not otherwise manage. However, in excessively high and longstanding stressful situations causing strain, allostatic systems may become over-stimulated and fail to function normally. This disturbance in the allostasis system is called “allostatic load” or the price of adaptation (McEwen and Stellar 1993). Allostatic load leads to disturbances in the defense system of the organism, causing changes in neuro-immuno-endocrinological and pain pathways, which over time may lead to disease (McEwen 1998, 2002, 2007). However, the deleterious effects of chronic stress can be counteracted by supporting the strengths of the individual, allowing him/her to function according to his value system and positive expectations, increasing social support, promoting healthy behaviors (physical exercise, stretching, pause gymnastics, optimal nutrition, optimal sleep and rest, moderate drinking, no smoking...), optimizing ergonomics and reducing strain related to psycho-socio-cultural aspects at the workplace (Antonovsky 1979, Hyyppä et al. 1991, Marmot et al. 1997, Bengel et al. 1999, Jackson 1999, Elovainio et al. 2002, Kalimo et al. 2003a, Heponiemi et al. 2006, McEwen 2007, Lindfors et al. 2009).

3.3 Burnout

Burnout refers to a negative consequence of chronic work-related stress (Maslach et al. 2001). Theoretical models of burnout range from individual to interpersonal, organizational, and societal. Many share the assumption of a chronic discrepancy between expectations of a motivated employee and the reality of unfavorable work conditions. Development moves toward burnout via dysfunctional ways of coping (Schaufeli and Enzmann 1998). Studies have shown that neuroticism, alexithymia, fragility, and low sense of coherence are related to vulnerability to burnout (Schaufeli and Enzmann 1998, Kalimo et al. 2003a).

According to Maslach (1996), burnout is defined as a three-dimensional psychological syndrome including emotional exhaustion, cynicism, and reduced professional efficacy. It also encompasses the process of energy depletion at work instead of reducing burnout to a state of fatigue (Schaufeli and Taris 2005). High scores for exhaustion and cynicism and low scores for professional efficacy indicate burnout (Maslach 1996). Kalimo (2003a) has further developed the MBI and formed a “Finnish burnout index” which makes it possible to assess the experience of burnout with one measure.

During the last decade the focus has been also on engagement, the positive antithesis of burnout, which has given new perspectives on interventions to alleviate burnout (Maslach et al. 2001).

3.4 Working conditions

Working conditions can be characterized as physical and mental conditions relating to the work environment. They are known to be potential sources of stress, health hazards, and disease, but they may also enhance well-being, work ability, and job and life satisfaction. Furthermore, they can shape health behaviors (Stansfeld et al. 1998, Kouvonen et al. 2007, Heponiemi et al. 2008). However, individual differences – linked to gender, genetics, life environment, life events, learned models to deal with stress, and actual life situation – play a crucial role in the etiological chain between working conditions and well-being and health (Antonovsky 1979, Cummings and Cooper 1979, McEwen 2002, McEwen 2007).

Moreover, individual factors can either make a person prone to strain or can protect him/her from it.

3.4.1 Physical workload

Physical conditions comprise one's workload such as demanding physical exercise and exposure to physical and chemical threats (Cox and Rial-Conzález 2000). Physical workload may be connected to health via physical (nociceptive) or psychological stress-mediated pathways (Cox and Rial-Conzález 2000, McEwen 2007). Physical workload is dependent on occupation (Hemström 2001) and has been mostly related to blue-collar work and low social class (Suadicani et al. 1995), but white-collar workers doing office work with computers experience a static and repetitive physical workload.

The anesthesiologist's work may consist of physical exertion – such as lifting heavy objects, repetitive motion, static muscle work, maintaining the same position without being able to move, difficult, awkward working positions, standing, walking – and exposure to cold, heat, humidity, dryness of the air, air conditioning, x-rays, magnetism, chemicals (cytostatics, cement for prostheses, gas, traces of narcotics in the air, formaldehyde), noise, bright light at night, infectious agents (TBC, influenza, HIV, hepatitis ...), wounds (needle stick), violence/aggression (Jackson 1999).

3.4.2 Mental workload

Mental workload can be understood as work-related psycho-socio-cultural factors affecting well-being and health. It constitutes an “umbrella concept” which includes organizational culture, roles in the organization, organizational justice, job control, workplace atmosphere, job security, and social support (Karasek 1979, Sherbourne and Stewart 1991, Elovainio et al. 2001, 2002, 2003, 2005).

In an anesthesiologist's profession, too-long working hours when on call, work without pauses, an excessive workload, too difficult procedures or clinical tasks, fear of harming patients, emotional demands when facing patients' pain, suffering, and death, an unfriendly workplace atmosphere, unclear tasks, lack of educational possibilities, dangerous or ergonomically poorly designed work environments, lack of professional

control and decision-making possibilities, and ideological conflicts at the workplace may bring on harmful stress (Jackson 1999, Åkerstedt et al. 2002, van Amelsvoort et al. 2003, Shanafelt et al. 2003, Cole and Carlin 2009, Wallace et al. 2009). Stressors outside work can also weaken one's management of work-related stress.

3.5 Models of psycho-socio-cultural factors affecting health

Three models defining stressful psycho-social factors affecting health have been tested: the job strain model, the social support model, and the organizational justice model. "These models have all gained some empirical support for predicting health problems and can be regarded as complementary models concentrating on different aspects of the perceived work environment. The job strain model focuses on situational factors of work and arrangements, the social support model on the quality of cooperation and social interaction at work, and the organizational justice model on decision-making procedures and managerial practices" (Karasek 1979, 1990, Sarason et al. 1987, Theorell 1990, Elovainio et al. 2001, Kivimäki et al. 2003a, Lindfors et al. 2009).

3.5.1 Job strain – Karasek's demand-control model

A discrepancy between demands and capacities, expectations, strengths, and needs can lead to harmful stress (Karasek 1979, Muntaner et al. 2006). Karasek created a model to study the effects of psycho-socio-cultural work stress on health outcomes (Karasek 1979). According to his demand-control model (DC-model), job strain is defined by the relationship between two independent inputs: job demands and control of the work situation. The former refers to psychological stress, such as having too much or too demanding work or both, or time pressure, or interruptions. The latter involves employees' authority to make decisions concerning their actual jobs and the use of their skills regarding their task variety and options to develop and learn new things. High job strain, according to this model, results from situations with high job demands and low job control. Karasek defined these two factors as the most important determinants of work-related well-being and health

(Karasek 1979). The DC-model focuses on the organization, not on the individual.

3.5.2 Demand-control-social support model

By refining the DC-model, Karasek and Theorell formulated a new model of work organization and its psychophysiological effects. According to this model, those who experience high social support are less at risk in a high-strain situation than are those who experience low social support (Theorell 1990, Karasek 1990).

This model has been criticized for its relevance to occupational homogeneity, for its stability over time, and for its conceptualization. Working with human beings, such as in the health profession, is different from and more complex than working with objects. Emotional demands (facing illness, pain, suffering) and conflicts between goals and reality are lacking from the concepts. The model has also been criticized for the interdependence of the two basic concepts: a worker with good decision authority over the work performed is able to diminish those demands which do not fit the model. The job strain model became, however, more applicable to human service organizations when social support was added (Söderfeldt 1996).

Despite criticism, this model with its modification has been validated in numerous epidemiological studies (Bosma et al. 1998). Meta-analyses have indicated that Karasek's model is linked with poor health outcomes and an increase in coronary heart disease in particular, which is not explained by physical or chemical exposures at the workplace (Kivimäki et al. 2006). Whitehall II studies have shown that low job control is a mediator that links low socio-economic status to higher mortality through cardiovascular deaths (Marmot et al. 1997). A recent study suggests that the demand-control-support model predicts not only job strain, but also job satisfaction and organizational commitment (Rodwell et al. 2009).

Both individual and group level assessments are important when studying the associations between these psycho-social factors and health. Moreover, social relations outside work should also be taken into account when studying employee's perceptions of their work. Organizational norms governing work performance and social relations, and conflicts in the work-family interface have explained variance in job stress (Hammer 2004). The most deleterious combination is assumed to be the conjunction

of high job demands, low job control, and lack of social support from colleagues and supervisors, which is called isolated strain (Karasek 1990).

3.5.3 Approaches to social support

Social support has been defined in many ways. It can be understood as non-work-related support from family members, friends, and significant others, as well as work-related support from co-workers, colleagues, or chiefs when facing difficulties (Sarason et al. 1987). It might also mean opportunities to interact with others or to have someone present (Karasek 1990). The interaction may take place in the form of feedback, backup, and give one the sense of being able to control one's environment (Caplan 1974). It may, in addition, bring to an individual the awareness of his/her being a member of a social network, receiving love and respect (Cobb 1976). Various studies have shown that people with greater social support adjust better to life changes than do those with less support (Antonovsky 1974, Caplan 1974, Bell et al. 1982). According to Hobfoll (1988), social support means relationships that give people real help and bind them to the social system that is believed to give love, care, and a sense of being attached to a respected social group or relationship. Brugh's (2005) studies suggested a minimum of four persons for the primary network of an individual to provide adequate support to allow well-being and health.

Social relationships enable a transfer of culture. The support of family and friends appears to be more effective than that of co-workers, colleagues, and chiefs in mitigating the effects of stress at work and outside work. According to one meta-analysis, social support has three effects: to reduce the load, the stress, and the strain (Viswesvaran et al. 1999).

The problem in the western cultures is the degeneration of societal structures leading to hyper-individualism and lack of social connectedness (Lindfors 2007).

3.5.4 Organizational justice

The term organizational justice refers to the extent to which employees are treated in a just way at their workplace. It includes a procedural component (the extent to which decision-making procedures include

input from the affected parties, are consistently applied, suppress bias, and are accurate, correctable, and ethical) and a relational component (polite, considerate, and fair treatment of individuals). It has been shown to be an important predictor of organizational attitudes, such as commitment and involvement, as well as of the feelings and behavior of employees (Cropanzano et al. 2001). Various studies support the link from low organizational justice to experienced strain, and further to sick leave and health problems (Elovainio et al. 2001, 2002, Kivimäki et al. 2003b, 2003c).

Organizational justice is sometimes suggested to represent a shared experience between employees in the same work unit. Some studies, however, show that it is individual perception that is essential for organizational justice to affect individual health (Cropanzano et al. 2001). A low-justice work environment, characterized by unjust organizational policies, practices, and procedures, is according to cross-sectional findings a greater risk to health than is unfair treatment from an immediate supervisor. A high sense of organizational justice appears to be linked to health, especially among highly educated people with demanding jobs, high status, and responsibility (Elovainio et al. 2002).

3.5.5 Approaches to organizational culture

Informal organization is essential for successful functioning of the formal organization (Barnard 1938). Definitions for culture and organization differ. Culture can be defined as the set of meanings, behavioral norms, values, and practices of members of a particular society as they construct their unique view of the world. As such, culture deeply informs every aspect of life and health. Effective interventions to restore and promote health may thus be enhanced through consideration of cultural contexts and configurations (Mezzich 2009).

In this study, the following concept for organizational culture was adopted: It means shared, learned ways of thinking and behavior among the members of the organization with the aim to develop individual and societal growth and adaptation. It is complex, comprising knowledge, moral, norms, customs, meanings, and socially transmitted ways of behavior (Tylor 1871, Keesing 1981, Schein 1985). A member of the organization grows into the culture and becomes dependent on it.

Each individual creates and reinforces the culture (Tylor 1871, Keesing 1981). Codes of conduct in the workplace ensure commitment, identity, coherence, and a sense of community (Barnard 1938).

According to Louis (1980): “The unspoken in an organization is more powerful than the spoken.” One gradually starts to sense the feeling of a workplace, and the way of working. Organizational culture may also be considered as the character of an organization, its climate, ideology and image.

The origins of the concept of organizational culture are in anthropology. The focus of its research has been since the 1990s on the uniquely integrative and phenomenological core of the subject, in which “the interweaving of individuals into a workplace community” takes place, and in the notions of meaning, emergence, and function (Louis 1980). The research in the field has been carried on from semiotic, cognitive, and interactional perspectives. According to Smircich (1985), culture can serve as a paradigm for understanding organizations and ourselves. “Culture is constantly in dynamic fusion and should not be reduced to one more variable in a static model of life at work.” Cultural research contributes to understanding, to improvement or potentiation – and answering the questions: What should be the role of work? How might individuals contribute and receive ...? How should efforts be organized?

3.6 Framework of the study

In this study, working conditions are approached from the perspective of perceived physical and mental workload related to on-call duty and sleep deprivation and psycho-socio-cultural factors – workplace atmosphere, job control, organizational justice, social support, and the work-home interface – and their connection with job strain.

The concepts of load, stress, and strain are adopted combining these theories: The focus is on the strain that the anesthesiologist feels when the workload (pressure, demand, change, threat) creates stress on him/her. Life satisfaction, job satisfaction, work ability, willingness to change jobs, and sick leave are outcomes of strain *vs* coping with strain reflecting the mismatch/match between the individual and the particular environment. Organizational culture – including organizational injustice, low job control, lack of social support at work, and unfriendly workplace

3 CONCEPTUAL FRAMEWORK OF THE STUDY

atmosphere – and being on call are hypothesized to be the biggest stressors or loading factors at work. Stress can be seen, on the one hand, as the force that arises when the workload directs at the anesthesiologist, causing strain. On the other hand, the “load” causing strain via stress can be intrinsic, related to the personal demands the anesthesiologist has put upon him-/herself. However, the “intrinsic load” is not studied here as such. The strain is expressed as perceived stress and stress symptoms. If the strain is too high or longstanding or both, coping mechanisms fail, and the anesthesiologist ends up with an allostatic load. Burnout and suicidality are outcomes of allostatic load.

Family (its consistency, stability, interaction style), friends (their number, quality, and proximity), and life events (protective and traumatic) can be seen as personal and family-related factors that interact with the strain vs coping. **Figure 1** illustrates the framework of the study.

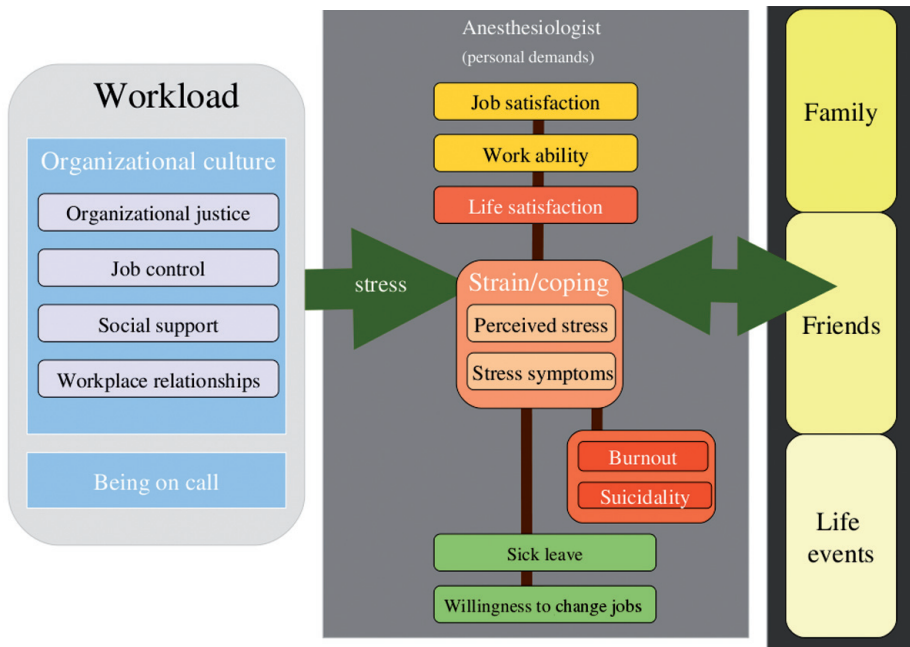


Figure 1. Framework of the study: work-related well-being of Finnish anesthesiologists.

4 PARTICIPANTS AND METHODS

4.1 Study design and participants

This was a cross-sectional survey with its study population comprising all specialized anesthesiologists residing in Finland in 2004. In March 2004, a postal survey with a covering letter went to all 684 of them with a reminder sent in October 2004. The participants' names came from the register of the Finnish Medical Association which covers all licensed physicians in Finland. Criteria for inclusion (I, III–V) were specialty of anesthesia (and intensive care), permanent residence in Finland, and a current job in the field of anesthesia. A total of 422 (62%) responded, of whom 20% were excluded as being retired, 1% for not working as anesthesiologists or not working at all. In Study II also those working part-time or partly retired were excluded. The final sample was 328 (60% of all working anesthesiologists [N=550] in 2004) in Studies I and III to V, and 258 in Study II. The representativeness of the respondents in relation to study population is shown in **Table 1**.

Table1. Representativeness of the respondents in relation to the basic study population according to gender and workplace

| | Respondents of the study (n = 328) | | | All Finnish anesthesiologists in 2004 (N = 550) | | |
|---------------------|---------------------------------------|-----------|--------------------|--|--------------------|--------------------|
| | n (%) | | | N (%) | | |
| Workplace | Women | Men | Total | Women | Men | Total |
| University hospital | 81 (53.3) | 86 (49.1) | 167 (51.1) | 103 (41.9) | 126 (41.4) | 229 (41.8) |
| Central hospital | 35 (23.0) | 50 (28.6) | 85 (26.0) | 48 (19.5) | 81 (26.6) | 129 (23.5) |
| District hospital | 22 (14.5) | 20 (11.4) | 42 (12.8) | 45 (18.3) | 39 (12.8) | 84 (15.3) |
| Other * | 14 (9.2) | 19 (10.9) | 33 (10.1) | 50 (20.3) | 51 (16.8) | 101 (18.4) |
| Total | 152, missing, 1 | 175 | 327, missing, 1 | 246 | 304, missing, 2 | 548, missing, 2 |

*Private hospital, private practice, research, health center hospital, other institution.

4.2 Questionnaire (I–V)

The questionnaire (Appendix) combined appropriate questions from the following studies: *Working Conditions and Work Strain among Physicians* (Töyry et al. 2000), *the RAND 36–Item Health Survey* (Hays et al. 1993), *the Finnish Adult Health Behavior Survey* (Helakorpi et al. 1997), *Evaluation of the organizational change process of the HUS-consortium in 2000–2002* (Kinnunen and Lindström 2002), *Health in Finland 1996* (Aromaa et al. 1997), *Work ability Index* (Tuomi et al. 1997), and *Work demands, working time, and sleep in IT society* (Härmä et al. 2002).

During the planning of the survey between 2002 and 2003, the questions were piloted among a group of specialist and resident anesthesiologists (n=16), and discussed with research anesthesiologists (n=4), occupational health researchers (n=7), research managers (n=8), and statisticians (n=2).

The final version of the questionnaire contained 78 standardized or previously widely applied questions on personal characteristics, employment, working environment, stress and burnout, being on call and well-being, life quality, job satisfaction and performance, general health

experience, health behavior, psycho-social support, and retirement. In addition, a set of questions concerning on-call stress symptoms was created for this study. Most of the questions were structured, but some open anesthesia-specific questions were included. Each respondent was also given an opportunity to add free narrative comments at the end of the questionnaire. Altogether, the survey contained several items in addition to the ones used in these studies.

4.2.1 Stress (I, III)

Stress level (I, III) was studied by use of a modified Occupational Stress Questionnaire (Elo et al. 1992, Töyry et al. 2000) “Do you feel stressed these days?” (no, to some extent, seriously). The answer scale was adjusted to equalize the interval between alternatives. *Reasons for stress* (I) were asked with the questions “What causes stress for you?” and “What is the greatest cause of stress for you?” including seven response alternatives (work, family, combining work with family, health, economic situation, close personal relationships, and some other reason as an open-ended alternative) (Töyry et al. 2000).

4.2.2 Worries at work (I) and excessive workload (I, III)

“Worries at work” is a modification of the questionnaire used in the Finnish physician studies (Töyry et al. 2000) with 26 questions covering time constraints, workload, working atmosphere, contents of work, professional control, combining work with family, lack of rest, and responsibility including five response alternatives (never or very seldom, rarely, sometimes, quite often, very often or continuously). Cronbach’s alpha calculated for worries at work was 0.92.

Excessive workload is one of the main factors derived from “worries at work” by use of factor analysis.

4.2.3 Burnout (I, III)

Burnout was assessed by use of the Maslach Burnout Inventory (MBI) (Maslach 1996) which consists of 22 questions relating to the three

components of burnout: emotional exhaustion, cynicism, and reduced professional efficacy. The MBI requires respondents to categorize their response to each question using a standard 7-point response format with anchored points never to every day. A standard coding template was used to score the results of the three dimensions of burnout. The scores are categorized as none (1), moderate (2) or severe (3) according to predetermined cut-off scores based on data from the general population in Finland (Kalimo et al. 2003a). The MBI is one of the most used and well-validated burnout measures (Maslach 1996, Töyry 2005). The version used in this study (MBI-HSS) was specifically designed for use with health professionals and has undergone testing and validation in a medical and nursing population (Maslach 1996). In addition to the MBI indices, we used the same *burnout index* as in the nationwide study of Finnish physicians (Töyry et al. 2000, Kalimo et al. 2003a): $(0.40 \times \textit{Emotional Exhaustion}) + (0.30 \times \textit{Cynicism}) + (0.30 \times \textit{Lack of Professional Efficacy})$. The factor-based Cronbach's alpha reliability coefficients in the previous Finnish study range from 0.87 to 0.96.

4.2.4 On-call data (I)

The on-call data were created with the following variables: *number of years' experience of being on call* (years as a resident included); *present on-call rota* (not currently on call, currently on call); *number of home and hospital calls a month*; *length of the on-call work period in hours* (day work before the on-call time included); *percentage of active hours when on call*.

4.2.5 On-call workload (I, II, V)

Four categories of on-call workload were created from the basic on-call data (see above): not currently on call or having solely home calls, 1 to 2 hospital calls a month, ≥ 3 hospital calls a month with $< 80\%$ activity, ≥ 3 hospital calls a month with $\geq 80\%$ activity (I, II). The last two categories were united in Study V: low = not currently on call or having solely home calls, medium = 1 to 2 hospital calls a month, high = ≥ 3 hospital calls a month.

4.2.6 On-call stress symptoms (I, III, IV, V)

Based on previous studies (Ahlava et al. 1977, Hyyppä et al. 1991, Weinger and Ancoli-Israel 2002, Meier-Ewert et al. 2004, Dinges et al. 2005, Van Cauter 2005), a questionnaire was created to elucidate the *symptoms* connected to sleep deprivation and the stress of being on call. The symptom list was supplemented by the symptoms reported by 16 anesthesiologists when on call. Altogether 36 symptoms were listed, with respondents stating whether they had the symptom while being on call or the day after, and after having been on vacation for 2 weeks (I, Table 1). The reliability coefficient Cronbach's alpha for the list of symptoms was 0.88. A sum variable of on-call symptoms, the *symptom average*, was formed. The Cronbach's alpha for symptom average was 0.87.

4.2.7 Sleep and on-call-related sleep deprivation (I)

Participants were asked to describe their *amount of sleep per day* in hours accurate to the nearest 0.5 hour including naps. *Adequacy of sleep* was asked about with the question "Do you sleep and rest enough?" (yes, no), and *the reasons for inadequate sleep* with the question "What do you think are the reasons for too little sleep?" including 12 response alternatives (workload, lack of time, sleep disturbance, bad health, being on call, other work-related reasons, other stressful life factors, going to bed too late, alcohol consumption, external disturbance [a crying baby, noise or uncomfortable bed], free time interests, other reason, what?) (Härmä et al. 2002).

Participants in the study were asked their reasons for sleep deprivation with a standard questionnaire (see above) by adding an anesthesia-specific question: "Is being on call one of the reasons for your sleep deprivation?" (no, yes).

4.2.8 Improvement of the on-call system (I)

An open question was created regarding improvement of the on-call system.

4.2.9 Self-rated health (II–V) and sick leave (I, II, IV)

Self-rated health was defined with the question “How would you estimate your current state of health?” (poor, fairly poor, average, fairly good, good) (Idler and Angel 1990). The reliability of the question is supported by its good predictability in longitudinal surveys concerning mortality (Idler and Benyamini 1997).

Sick leave involved the question “Have you been on sick leave during the past year?” (no, yes) (Helakorpi et al. 1997, Töyry et al. 2000).

4.2.10 Job satisfaction (II, III), work ability (II), and life satisfaction (II)

Job satisfaction was assessed with the question “Do you feel you can get satisfaction from your work?” (never, sometimes, often, always) (Elo et al. 1992). *Work ability* was assessed with the question “Assume that your work ability at its best has a value of 10 points. How many points would you give to your current work ability on a scale from 1 to 10?” (Tuomi et al. 1991, 1997, Ilmarinen and Tuomi 2004). *Life satisfaction* involved the question “How satisfied are you generally with your life?” (very unsatisfied, fairly unsatisfied, fairly satisfied, very satisfied) (Hays et al. 1993, Idler and Benyamini 1997).

4.2.11 Job demands (II)

Job demands, forming a part of the total workload, were indicated by multiple measures: (1) ordinary working hours, (2) on-call workload (section 4.2.5), (3) physical and mental workload. (1) *Ordinary working hours* was formed as a sum variable “weekly working hours at main work (on-call hours excluded) + commuting time + work-related unpaid studying hours outside work + hours spent on a secondary job.” (2) *Physical workload* was asked with a question “Is your work physically (light, fairly light, fairly heavy or heavy)?”, and *mental workload* with an analogous question “Is your work mentally (light, fairly light, fairly heavy or heavy)?” (Lehto 1992, Töyry et al. 2000).

4.2.12 Organizational justice (II–V)

To assess organizational justice required a sum variable of Moorman's Procedural Justice Scale (Moorman 1991) dealing with decision-making in an organisation: 1) "Decisions are made based on accurate information." 2) "Incorrect decisions can be changed." 3) "Everyone can express his/her opinion concerning decision-making related to his/her work." 4) "Decisions made are consistent." 5) "The effects of the decisions are studied and information on the effects delivered." 6) "Additional information on the basis of the decisions is available." Each argument had five Likert-type answering alternatives. (1=I fully disagree, 5 = I fully agree). Cronbach's alpha coefficient in our study was 0.91.

4.2.13 Job control (II, III, V)

Job control was assessed by forming a sum variable based on Karasek's modified job content questionnaire (Karasek 1979, Elo et al. 1992): "To what extent can you influence the following aspects at your work?: 1) changes made at work, 2) daily tasks at work, 3) order of daily tasks, 4) use of time, 5) pace of work, 6) working methods, 7) division of tasks, 8) decisions regarding co-workers, and 9) the tools and machines you work with." Each item included four Likert-type response alternatives (1=not at all, 4= much). Cronbach's alpha coefficient in this study was 0.90.

4.2.14 Conflicts at the workplace (III, IV)

Conflicts with superiors were studied with the question: "How often do you have conflicts with your superiors at your workplace?" (never, occasionally, relatively often, frequently). *Conflicts with co-workers* was asked by "How often do you have conflicts with your co-workers at your workplace?" (never, occasionally, relatively often, frequently) (Töyry et al. 2000).

4.2.15 Job turnover (III)

To study the attitudes to job turnover two questions were asked: a) "If it were possible, would you change your job as a physician to a job of a

physician in some other field with the same salary?” (no, possibly, yes) and b) “If it were possible, would you change your job as a physician to a job in a profession other than a physician’s with the same salary?” (no, possibly, yes). For the final analysis, both variables were dichotomized: no, yes (possibly or yes) (Töyry et al. 2000).

4.2.16 Social support (II–V) and friends (IV)

Social support was assessed by forming the sum variable of a modified standard questionnaire (Sherbourne and Stewart 1991): “Have you got someone... 1) from whom you can get help when you are bedridden, 2) who gives you good advice in a crisis, 3) who takes you to the doctor if needed, 4) on whom you can rely and to whom you tell your problems, 5) from whom you can receive tenderness, 6) with whom you can spend time and relax, 7) whom you love and who makes you feel needed, 8) with whom you can satisfy your sexual needs, 9) who helps you in ordinary tasks when you can not make it on your own.” Each item included five Likert-type response alternatives (1 = never (support), 5 = always. The Cronbach’s alpha coefficient in this study was 0.89. Number of *friends* was inquired with a question ‘How many friends have you got?’ including an open-ended answering possibility. The answers were merged into two categories (>3 friends, 0–3 friends).

4.2.17 Domestic work time (II) and care responsibility (III)

Domestic work time was inquired with a question “How many hours a day do you spend on domestic work or taking care of your children or other relatives?” *Care responsibility* was assessed by “Do you have the responsibility to take care of somebody (a child, a parent, ...)?” (yes, no)

4.2.18 Family problems (II, IV) and traumatic life events (IV)

Problems related to participant’s family were assessed by asking “How are things at home and in your family?” (everything all right, nearly all right, somehow worrying, worrying). (Töyry et al. 2000) *Traumatic life events*

were inquired about with a question “Have you, your family, or other people close to you suffered from traumatic life events during the last five years that still affect your life?” (1 = no, 2 = yes)(Töyry et al. 2000).

4.2.19 Health behavior: hangover and smoking or chewing tobacco (IV)

Hangover was studied as an indicator of problematic alcohol consumption. “How often have you had a hangover during the last year?” (not once, 1–2 times, 3–5 times, 6 times or more) (Töyry et al. 2000). For the final analysis, the answers were dichotomized (< 6 times a year, ≥ 6 times a year). *Smoking or chewing tobacco*: a) “Do you smoke?” (1 = no, 2 = yes, 3 = occasionally) (Töyry et al. 2000); b) “Do you chew tobacco?” (1 = no, 2 = yes, 3 = occasionally). The two questions and their answers were merged in the following way: “Do you smoke or chew tobacco?” (1= no, 2 =yes or occasionally).

4.2.20 Suicidality (I, IV), depression (IV), and the use of antidepressants (IV)

Suicidality of the participants was assessed by asking Kessler’s standard question (Kessler et al. 1999) which has been shown to predict real suicide attempts (Bernal et al. 2007): “Have you ever seriously considered suicide or made plans to commit suicide?”(never, I have thought about suicide, I have seriously planned suicide, I have attempted suicide). The three last alternatives were merged into one: “suicidality”. *Depression* was assessed with the question “How often have you suffered from depression during the last 12 months?” (never or seldom, occasionally, fairly often, continuously). The question about depression was included as a single item in a list of 18 different kinds of symptoms or diseases, not as a question of its own (Töyry et al. 2000).

The use of antidepressants was inquired by asking “Do you use antidepressants?” (never, occasionally, fairly often, continuously)(Töyry et al. 2000). This question was included as a single item in a list of five kinds of drugs, not as a question of its own.

4.2.21 Cumulative risk indicators for suicidality (IV)

Work-related cumulative risk indicator: A sum variable of work-related questions was formed as follows: (conflicts with superiors + conflicts with co-workers + organizational justice + on-call symptoms) ÷ 4. *Family-related cumulative risk indicator:* A sum variable of family- and personal-related questions was formed as follows: (hangover + smoking or chewing tobacco + family problems + traumatic life events + social support + friends) ÷ 6. *Combined cumulative risk indicator:* A sum variable of all work- and family-related and personal risk factors was formed: (conflicts with superiors + conflicts with co-workers + organizational justice + on-call symptoms + hangover + smoking or chewing tobacco + family problems + traumatic life events + social support + friends) ÷ 10. Before the summations, each variable was dichotomized (IV, Table 1).

4.3 Data collection

The questionnaires were sent in coded envelopes from the Finnish Medical Association in March 2004. The respondents returned the completed questionnaires to the Finnish Medical Association where the codes of the envelopes were recorded in order to monitor the posting process. The questionnaires were then sent to the researcher (the author of this thesis) from the Finnish Medical Association. To ensure anonymity, no identification codes were on the questionnaire itself. A reminder was sent to non-respondents from the Finnish Medical Association in October 2004.

The researcher coded and saved the data manually during 2 months. The respondents completed the questionnaires quite well. “Fewer than 1% of the questionnaires/questions remained unanswered, but some > questionnaires like the MBI had one or two questions left unanswered > by about 10% of the respondents.”

4.4 Statistical analyses

The data of this thesis included both categorical and continuous variables. Some outcome variables were treated as continuous measures. The

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data were analyzed mainly by frequency, cross-tabulation, independent samples and Student's *t*-test, correlations, one-way ANOVA, and linear and logistic regression analysis. Factor analysis was used for the MBI and worries-at-work question list. Correlations were used to check the associations between the continuous dependent and independent variables and to choose the final variables. They were tested with linear regression analysis, first univariate and then multivariate. Student's *t*-test served for testing continuous variables in gender groups. Spearman's correlations were applied when checking associations between continuous and categorical variables. The chi-squared test was applied for the preliminary analysis and logistic regression for the chosen models of categorical variables. The confidence interval (CI) was set at 95%. A *p*-value of < 0.05 was chosen as level of significance. Reliability was examined by calculating Cronbach's alpha coefficients for sets of variables without previous reliability information. Sample-specific comparison was also made between the same individual at work and after a holiday period. Analyses were carried out with SPSS FOR WINDOWS Releases 12.01 (I–III) and 14.0 (IV–V).

5 RESULTS

5.1 Demographic data and participant and organizational characteristics

Demographic data are presented in **Table 2**, and participants' characteristics in **Tables 2** and **3**, and organizational characteristics in **Table 3**.

Table 2. Demographic data of the study

| Variable | Women n(%) 153(46.6) | Men n(%) 175(53.4) | Total n(%) 328(100.0) |
|-------------------------------|---------------------------|---------------------------|---------------------------|
| Age | | | |
| mean in years (SD) [range] | 45.3 (7.3) [32–62] | 49.3 (7.8) [33–69] | 47.4 (7.8) [32–69] |
| Age categorized n (%) | | | |
| 32–39 years | 35 (22.9) | 19 (10.9) | 54 (16.5) |
| 40–49 years | 79 (51.6) | 76 (43.4) | 155 (47.3) |
| 50–59 years | 28 (18.3) | 57 (32.6) | 86 (26.2) |
| 60–69 years | 10 (6.5) | 22 (12.6) | 33 (10.1) |
| Work pattern n (%) | | | |
| Full-time work | 121 (79.6) | 137 (78.3) | 258 (79.1) |
| Part-time work | 21 (13.8) | 19 (10.9) | 40 (12.7) |
| Partly retired | 10 (6.6) | 18 (10.3) | 28 (8.6) |
| Total | 152 (99.3), missing, 1 | 174 (99.4), missing, 1 | 326 (99.4), missing, 2 |
| Job contract n (%) | | | |
| Permanent | 126 (82.9) | 157 (89.7) | 283 (86.5) |
| Fixed term | 12 (7.9) | 12 (6.9) | 24 (7.3) |
| Vacant | 14 (9.2) | 6 (3.4) | 20 (6.1) |
| Total | 152 (99.3), missing, 1 | 175 (100.0) | 327 (99.6), missing, 1 |
| Marital status n (%) | | | |
| Married or cohabiting | 111 (72.5) | 161 (92.5) | 272 (83.1) |
| Single | 29 (19.0) | 4 (2.3) | 33 (10.1) |
| Divorced | 12 (7.8) | 8 (4.6) | 20 (6.1) |
| Widowed | 1 (0.7) | 1 (0.6) | 2 (0.6) |
| Total | 153 (100.0) | 174 (99.4), missing, 1 | 327 (99.7), missing, 1 |

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Table 3. Participant and organizational characteristics

| Variable | n | % |
|---|-----------------|------|
| Stressed (n = 326/328) | | |
| No | 104 | 31.9 |
| To some extent | 179 | 54.9 |
| Seriously | 43 | 13.2 |
| Burnout (index) (n = 287/328) | | |
| None | 206 | 71.8 |
| Moderate | 80 | 27.9 |
| Severe | 1 | 0.3 |
| Emotional exhaustion (n = 317/328) | | |
| None | 165 | 52.1 |
| Moderate | 120 | 37.9 |
| Severe | 32 | 10.1 |
| Cynicism (n = 314/328) | | |
| None | 210 | 66.9 |
| Moderate | 97 | 30.9 |
| Severe | 7 | 2.2 |
| Lack of professional efficacy (n = 219/328) | | |
| None | 182 | 83.1 |
| Moderate | 35 | 15.1 |
| Severe | 2 | 0.9 |
| On-call workload (n = 326/328) | | |
| None / On-call solely from home | 101 | 31.0 |
| 1–2 hospital calls per month | 86 | 26.4 |
| >3 hospital calls per month, < 80% activity | 73 | 22.4 |
| >3 hospital calls per month, > 80% activity | 66 | 20.2 |
| On-call stress symptoms (n = 261/328) | | |
| Only a few | 94 | 36.0 |
| Some | 80 | 30.7 |
| Many | 87 | 33.3 |
| Amount of sleep per day in hours (n=325/328) | | |
| Mean (SD) [range] | 7.2 (0.7) [5–9] | |
| Sleep sufficiency (n = 325/328) | | |
| Yes | 148 | 45.5 |
| No | 177 | 54.5 |
| On-call-related sleep deprivation (n = 314/328) | | |
| No | 219 | 69.7 |
| Yes | 95 | 30.3 |

continues...

5 RESULTS

Table 3. continues...

| Variable | n | % |
|--------------------------------------|------------------------|------|
| Health status (n = 326/328) | | |
| Good | 113 | 34.2 |
| Fairly good | 132 | 40.5 |
| Average | 62 | 19.0 |
| Fairly poor | 17 | 5.2 |
| Poor | 2 | 0.6 |
| Sick leave (n = 325/328) | | |
| No | 172 | 53.0 |
| Yes | 153 | 47.0 |
| Job satisfaction (n = 323/328) | | |
| Never | 1 | 0.3 |
| Sometimes | 69 | 21.4 |
| Often | 231 | 71.5 |
| Always | 22 | 6.9 |
| Work ability (n = 328/328) | | |
| Mean (SD) [range] | 8.3/10 (1.4) [2–10] | |
| Life satisfaction (n = 324) | | |
| Very unsatisfied | 1 | 0.3 |
| Fairly unsatisfied | 26 | 8.0 |
| Fairly satisfied | 202 | 62.3 |
| Very satisfied | 95 | 29.3 |
| Ordinary working hours (n = 258/258) | | |
| Mean (SD) [range] | 47 (10.8) [13–147] | |
| Physical workload (n = 328/328) | | |
| Light | 39 | 11.9 |
| Fairly light | 176 | 53.7 |
| Fairly heavy | 93 | 29.4 |
| Heavy | 20 | 6.1 |
| Mental workload (n = 325/328) | | |
| Light | 4 | 1.2 |
| Fairly light | 58 | 17.8 |
| Fairly heavy | 184 | 56.6 |
| Heavy | 79 | 24.3 |
| Organizational justice (n = 318/328) | | |
| Mean (SD) [range] | 2.9/5 (0.9) [1–5] | |
| Low | 88 | 27.7 |
| Medium | 121 | 38.1 |
| High | 109 | 34.3 |

continues...

5 RESULTS

Table 3. continues...

| Variable | n | % |
|---|------------------------|------|
| Job control (n=322/328) | | |
| Mean (SD) [range] | 2.3/4 (0.6) [1–4] | |
| Low | 94 | 29.2 |
| Medium | 105 | 32.6 |
| High | 123 | 38.2 |
| Conflicts with superiors (n = 326/328) | | |
| Never | 24 | 7.4 |
| Occasionally | 210 | 64.4 |
| Relatively often | 71 | 21.8 |
| Frequently | 21 | 6.4 |
| Conflicts with co-workers (n = 327/328) | | |
| Never | 19 | 5.8 |
| Occasionally | 230 | 70.3 |
| Relatively often | 59 | 18.0 |
| Frequently | 19 | 5.8 |
| Willingness to change jobs | | |
| A. to another physician's job (n = 326/328) | | |
| No | 225 | 69.0 |
| Possibly | 87 | 27.0 |
| Yes | 14 | 4.0 |
| B. to a non-physician job (n = 325/328) | | |
| No | 184 | 57.0 |
| Possibly | 115 | 35.0 |
| Yes | 26 | 8.0 |
| Social support (n = 312/328) | | |
| Mean (SD) [range] | 4.2/5 (0.8) [1.2–5] | |
| High support ($\geq 3/5$) | 289 | 92.6 |
| Low support ($< 3/5$) | 23 | 7.4 |
| Friends (n = 319/328) | | |
| Mean (SD) [range] | 4.7 (4.8) [0–70] | |
| More than 3 friends | 185 | 58.0 |
| 0–3 friends | 134 | 42.0 |
| Domestic working time (n = 323/328) | | |
| Mean (SD) [range] | 2.3 (1.8) [0–18] | |

continues...

5 RESULTS

Table 3. continues...

| Variable | n | % |
|-------------------------------------|-----|------|
| Family problems (n = 324) | | |
| Everything all right | 115 | 35.5 |
| Nearly all right | 162 | 50.0 |
| Somehow worrying | 37 | 11.4 |
| Worrying | 10 | 3.1 |
| Traumatic life events (n = 321/328) | | |
| No | 178 | 56.0 |
| Yes | 143 | 44.0 |
| Hangover (n = 324/328) | | |
| Not once | 162 | 50.0 |
| 1–2 times a year | 100 | 30.9 |
| 3–5 times a year | 43 | 13.3 |
| ≥ 6 times a year | 19 | 5.2 |
| Smoking (n = 327/328) | | |
| No | 277 | 84.7 |
| Yes | 23 | 7.0 |
| Occasionally | 27 | 8.3 |
| Chewing tobacco (n = 327/328) | | |
| No | 321 | 98.2 |
| Yes | 4 | 1.2 |
| Occasionally | 2 | 0.6 |
| Suicidality (n = 326/328) | | |
| Never | 246 | 75.5 |
| I have thought about suicide | 73 | 22.4 |
| I have seriously planned suicide | 7 | 2.1 |
| I have attempted suicide | 0 | 0.0 |
| Depressive symptoms (n = 318/328) | | |
| Never or seldom | 230 | 72.3 |
| Occasionally | 66 | 20.8 |
| Fairly often | 17 | 5.3 |
| Continuously | 5 | 1.6 |
| Antidepressant use (n = 317/328) | | |
| No | 299 | 94.3 |
| Occasionally | 5 | 1.6 |
| Fairly often | 2 | 0.6 |
| Continuously | 11 | 3.5 |

5.2 On-call stress (I)

5.2.1 On-call workload

The in-hospital work period lasted from 14 to 38 hours, mean, 24 hours. The anesthesiologists had both hospital (range 1–7) and home (range 0–18) calls three times a month on average. The average activity for hospital calls was 81% and for home calls 29%. The respondents had on average 13 active on-call hours a week (**Table 4**). Young specialists had more calls a month than their older counterparts. No gender differences appeared in the category distribution. (I, Table 2)

Table 4. On-call-related characteristics of participants

| | Women | Men | Total |
|--|-------------|--------------|-------------------------|
| Number of participants n (%) | 153 (47) | 175 (53) | 328 (100) (I, III–V) |
| Experience in the field of anesthesia in years [range] | 16.2 [5–36] | 21 [6–36] | 19 [5–36] |
| Number of participants having calls/n (%) | 94/148 (64) | 125/166 (75) | 219/314 (69) |
| Years with on-call rota | 15.9 [5–36] | 20.4 [6–40] | 18.3 [5–40] |
| On-call work period in hours | 24 [15–36] | 24 [14–38] | 24 [15–36] |
| Number of hospital calls per month | 2.8 [1–6] | 2.8 [1–7] | 2.8 [1–7] |
| Number of home calls per month | 2.9 [0–12] | 3.4 [0–18] | 3.2 [0–18] |
| Active on-call hours per call | 13 [3–24] | 13 [4–24] | 13 [3–24] |

5.2.2 Level and causes of stress

Of the respondents, 68% felt stressed. The main self-reported reasons for this stress were: work in 64% (79% in the on-call category 4) and combining work and family in 48% of cases (I, Figure 1). Other reasons for stress were health (17%), family (16%), personal relationships (13%) and financial issues (12%). The three main factors of “worries at work” (section 4.2.2) divided by factor analysis were: 1. Time constraints and excessive workload, 2. Workplace atmosphere and organizational issues, and 3. Responsibility and fear of harming patients. The most stressful separate items of the first factor were combining work with family and being on call. Perceived stress ($p=0.02$) was augmented with on-call workload, (**Table 5**).

Table 5. Data of the mean comparable variables (total n=328). (Reprinted with the permission of John Wiley & Sons Ltd [Study I].)

| Active On-Call Hours a Week | Burnout % M+S (S) | | | Emotional Exhaustion % M+S (S) | | | Cynicism % M+S (S) | | | Lack of Professional Efficacy % M+S (S) | | |
|-----------------------------|--------------------------|-----------------------|------------------------|--------------------------------------|---------------|------------------------|--------------------------|---------------|------------------------|---|---------------|------------------------|
| | All N=287 | Cat 4 N=60 | M+S N=228 p=.008 | All N=317 | Cat 4 N=62 | M+S N=255 p=.015 | All N=314 | Cat 4 N=62 | M+S N=252 p=.039 | All N=291 | Cat 4 N=62 | M+S N=229 p=.085 |
| 12.5 | 28 (0.4) | 45 (0) | | 48 (10) | 68 (11) | | 33 (2) | 45 (5) | | 17 (1) | 27 (2) | |
| | Stressed % M+S (S) | | | Having Been on Sick Leave % | | | Suicidal Tendencies % | | | | | |
| All N=326 | Cat 4 N=65 | M+S N=261 p=.02 | | All N=325 | Cat 4 N=66 | M+S N=259 p=.040 | | All N=326 | Cat 4 N=66 | M+S N=260 p>.05 | | |
| 68 (13) | 80 (22) | | | 47 | 53 | | | 25 | 26 | | | |

Abbreviations: M+S, both Moderate and Severe; (S), Severe only; Cat, Workload Category.

5.2.3 Stress symptoms

The most frequent symptoms when on call (see 4.2.6) were: exhaustion, irritation, yawning, sleep disturbances, feeling cold, memory disturbances, and headache (I, Table 1, Figure 3) (**Figure 2**). However, the highest ratio for manifestations of symptoms while on call *vs* on vacation were between: nausea, coordination disturbances, exhaustion, dizziness, difficulties in understanding speech, and tremor. The most significant difference in symptoms was within the individual when on call *vs* on vacation. A significant positive correlation appeared between symptoms and on-call workload (category) (I, Table 4, Figures 2, 3). The association between gender and symptoms was statistically significant (I, Table 4). Women had on average 9% more symptoms than men. They suffered from feeling cold and from peripheral oedema, and from feelings of guilt more frequently than did men (I, Figure 3). Age correlated negatively with the symptoms ($r = -0.22$, $p < 0.001$); younger anesthesiologists having more symptoms than their older colleagues.

The on-call symptom average was significantly associated with gender, stress, sick leave, perceived sleep deprivation, and suicidality (I, Table 5).

5.2.4 Burnout

Creation of the questionnaire is explained in section 4.2.3. Emotional exhaustion and burnout increased with strain and number of duties. Exhaustion was reported by 32% in the lowest and 68% in the highest on-call category, burnout (index) by 18% and 45%. Figure 4 (I) shows burnout and emotional exhaustion in categories 1 to 3 *vs* category 4. The figures for burnout index and its separate indices are in **Table 5**. Exhaustion was 8% more frequent among women than men, but statistically non-significantly. In the on-call category 4, the risk for emotional exhaustion adjusted for age and sex was 1.4 when compared to category 1 (OR = 1.4, 95% CI 1.1–1.7). The risk for burnout was 1.3 (1.3, 1.1–1.6).

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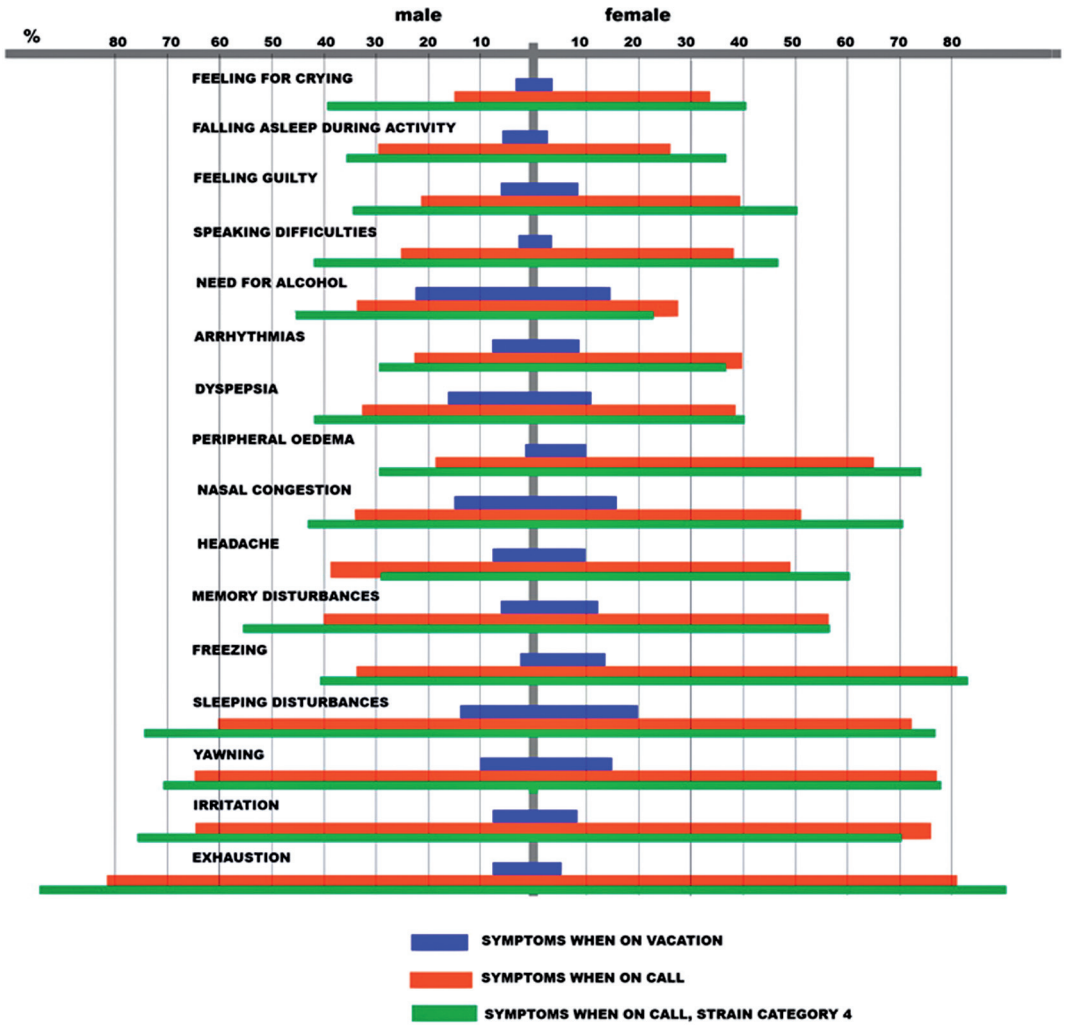


Figure 2. Frequencies of symptoms for men and women when on vacation (Categories 1–4) and when on call (Categories 1–4, Category 4). (Reprinted with the permission of John Wiley & Sons Ltd [Study I].)

5.2.5 Sleep

The respondents slept a mean of 7 hours (range 5–9). Of all, 46%, and 38% in the on-call category 4 slept sufficiently ($p=0.037$). The figure for women was 36% and for men 54% ($p<0.001$). The most frequently reported reason (30% of respondents) for perceived sleep deprivation was being on call.

5.2.6 Suicidality

A quarter (24.5%) of all respondents had thought of committing suicide, and 2.1% had seriously planned it (IV, Table 1). Figures were similar for all on-call categories (**Table 5**) and for both genders (I). Suicidal tendencies were associated with sleep disturbances ($p=0.009$) (I).

5.2.7 Sick leave

During the past year, 47% of the respondents had been on sick leave. The figures were 52% for women, 43% for men ($p=0.08$), and 53% in on-call category 4 ($p=0.040$) (**Table 5**).

5.2.8 Suggestions for improvement of the on-call system

Anesthesiologists made 114 free-text suggestions for improving the on-call system. The most frequent were: 1) shortening the on-call period for 89% ($n=101$), 2) reducing the on-call frequency for 30% ($n=34$), 3) always having two free days per week for 26% ($n=30$), 4) having no on-call obligations after age 50 for 10% ($n=11$).

5.3 Job satisfaction, work ability, and life satisfaction (II)

Participant characteristics for all respondents can be seen in **Tables 2** and **3**. Study II included only those working full time ($n=258$).

5.3.1 Gender differences relating to participants' characteristics

Fewer women (83%) than men (94%) had a permanent job contract ($p=0.005$). No gender differences existed in ordinary weekly working hours or on-call workload. Both men and women had on average fairly good health. Both genders felt that their work was physically fairly light, but women perceived their work as being heavier than did men. Women used more time for domestic duties and had fewer possibilities for job control. No gender differences existed in job satisfaction, work ability, or life satisfaction (II, Table 1).

5.3.2 Job satisfaction

The figure for often receiving satisfaction from their work was 71%, and the figure for sometimes, was 23%. In the fully adjusted model, job satisfaction in both genders correlated with job control. In men, job satisfaction was also related to organizational justice, and in women to health. (II, Table 2)

5.3.3 Work ability

Half the respondents rated their work ability as good or excellent (9 to 10/10). Only 17% rated their work ability at 7/10 or less. Work ability was correlated with health and job control among both genders. However, among men the correlation between work ability and job control was not statistically significant. Among women work ability was negatively correlated with family problems (II, Table 3).

5.3.4 Life satisfaction

Of the respondents, 28% were very satisfied, and 62% were fairly satisfied with their lives. Only 10% of the respondents were somewhat dissatisfied. Life satisfaction among both genders was positively correlated with social support and negatively correlated with family problems. Among women, life satisfaction was positively correlated with health, whereas among men a negative correlation emerged with physical workload (II, Table 4).

5.4 Attitudes toward job turnover (III)

5.4.1 Participants' characteristics relating to job turnover

Most of the respondents had had at least occasionally conflicts with their superiors and co-workers. Most of them had fairly low control over their job and perceived the level of justice they experienced at work as inadequate. They reported having moderate stress and on-call-related stress symptoms.

Of the respondents, 31% were possibly or definitely willing to change their job to another physician's job, and 43% to a job in some other profession (**Table 3**). No gender differences existed in these outcomes.

5.4.2 Correlates of job turnover

Conflicts with colleagues, job control, and organizational justice

Respondents with frequent conflicts with superiors and co-workers had a 6- to 7-fold risk of having the desire to change their job to another physician's job and a 3- to 4-fold risk of changing to a job in some other profession compared to those with no or occasional conflicts in the crude model. Respondents with low job control and a low sense of justice had a 2.1- to 3.5-fold risk for job turnover intentions compared to those with high job control and a high sense of justice in the workplace in the crude model. The effect toward leaving their physician's career was stronger than the effect toward changing to another physician's job (III, Table 2).

Stress, job satisfaction, and on-call stress symptoms

Compared to those with no stress, severely stressed respondents had a 7.2-fold risk of considering the change to another physician's job and a 5.0-fold risk for wishing to change to a job in some other profession. The anesthesiologists not satisfied with their jobs had a 4- to 5-fold risk for job turnover intentions compared to the satisfied ones (III, Table 2). On-call stress symptoms were associated only with willingness to change to another profession.

Age, marital status, social support, health, and care responsibility

Willingness to change jobs decreased with increasing age. Singles and those with low social support had an almost 2-fold risk of job turnover intentions compared to married people or those with high social support. Compared to those with good health, respondents with poor health had a 3-fold risk for the intention to change to another profession. The responsibility to take care of somebody protected against their wanting to change to another profession. Gender, job contract, and workplace were not associated with job turnover.

5.5. Suicidality (IV)

5.5.1 Participants' characteristics relating to suicidality

Almost one in five respondents had had a hangover from excessive drinking more than six times a year. Nearly half of them had suffered some traumatic life event during the last 5 years, and 64% reported having family problems, 42% reported having fewer than four friends, and 7% had low social support. One in four respondents reported having had suicidal tendencies (**Table 3**). The confounding factors did not change the risks markedly (IV, Table 2).

5.5.2 Cumulative risk factors

The formulation of cumulative risk factors (section 4.2.21) showed that 35% of the respondents (109 of 315) had no work-related risk factors, whereas 18% (56 of 315) had three or four such risk factors (IV, Figure 1). Though 19% of the respondents (56 of 297) had no family-related risk factors, 16% (48 of 299) had three to six such risk factors (IV, Figure 2); 8% (23 of 287) had no risk factors, whereas 30% (86 of 287) had four to nine risk factors (work- and/or family related) (IV, Figure 3) (**Figure 3**).

5 RESULTS

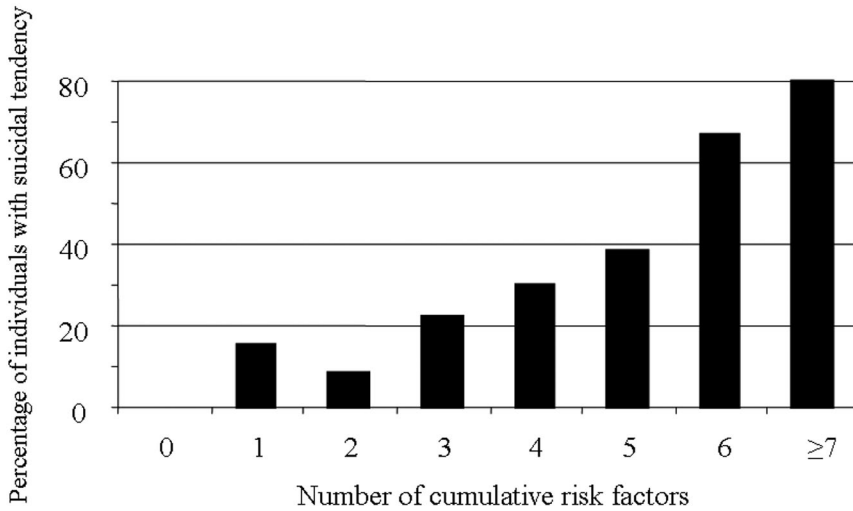


Figure 3. Incidence of suicidal tendencies among individuals with different number of cumulative work or family-related or personal risk factors. (Reprinted with the permission of John Wiley & Sons Ltd [Study IV].)

5.5.3 Correlates of suicidality

Respondents with poor health and low social support were at the highest risk for suicidality (crude OR 11.2, 95% CI 3.8–33.0 and 10.5, 4.0–27.9). The highest risks at work were conflicts with co-workers (4.1, 2.3–7.1) and superiors (2.1, 1.2 to 3.6), on-call-related stress symptoms (3.9, 1.9 to 8.3) and lack of organizational justice (1.9, 1.1 to 3.2). Those with some or many family problems had a 6- to 7-fold risk for suicidality compared to those without or with only few family problems. Having a hangover six or more times a year also indicated a high risk for suicidality (IV, Table 2).

If a respondent had several risk factors, each additional factor doubled the risk for suicidality (IV, Table 4, Figure 1–3).

5.6 Mitigating on-call symptoms (V)

5.6.1 On-call symptoms and organizational justice, job control, and social support

High levels of job control and social support were associated with a low number of symptoms while on call or the day after in the unadjusted model, and when adjusted for age, gender, and workplace. However, additionally adjusting for on-call category and self-rated health attenuated the effects to nonsignificant. High organizational justice was associated with low number of symptoms while on call or the day after, and this association persisted even after all adjustments. (V, Table 1) All psycho-social factors studied were unrelated to symptoms while on vacation.

5.6.2 Interactions between psycho-social factors and on-call category on the number of on-call stress symptoms

We also tested the effects of two-way interactions between psycho-social factors and on-call category on the number of symptoms when the effects of age and gender were adjusted for. The interactions between on-call category and job control ($t = -2.71$, $p = 0.007$) and between on-call category and organizational justice ($t = -2.52$, $p = 0.012$) were significant for symptoms while on call or the day after. The number of symptoms was low irrespective of job control and justice levels when the participants were on call solely from home (V, Figure 1). In contrast, among those being on call from the hospital, the number of symptoms was high when job control or justice levels were low. Moreover, when job control or justice levels were high, the number of symptoms was low also for those being on call from the hospital. Thus, good job control and organizational justice might form a buffer against hospital on-call-related stress symptoms. The interaction of on-call category with social support ($t = 0.29$, $p = 0.5775$) was unrelated to symptoms while on call or the day after.

6 DISCUSSION

6.1 Comparison to previous studies

6.1.1 Stress among anesthesiologists

In addition to stressful trends in the medical profession (section 6.2.1), stress is endemic in the work content of an anesthesiologist (Cooper et al. 1999): He or she is the first to take the responsibility for the critically ill patient and keep him alive. During on-call duty the anesthesiologist has to work extremely long hours, resisting exhaustion and taking responsibility for difficult, unpredictable cases, doing difficult and dangerous procedures without the opportunity for proper consultation. During the administration of anesthesia, the anesthesiologist has to sustain an intense and prolonged vigilance focused on each patient's status, which causes in the anesthesiologist an ongoing physiological arousal. Anesthesiologists are shown to suffer from progressive tachycardia, hypertension, extrasystolia, and even ST segment depression during the challenging stages of anesthesia, showing peaks at intubations (Jackson 1999). According to Payne and Rick (1986), anesthesiologists' work contains higher momentary stress and more unexpected stressful situations than does any other physician's work.

In this study, "stress" was approached as a perception of strain. More than two-thirds of all working anesthesiologists and 80% of those with the highest on-call burden reported feeling stressed, and 13% of all reported being severely stressed (I). In a nationwide study of Finnish physicians (Töyry et al. 2000), using the same question, the corresponding figure was 80% for all anesthesiologists, indicating higher stress levels than among other physicians.

According to Dickson (1996), 19% of the British anesthesiologists who took part in their study had felt stressed during the last month, and 40% of the stressed doctors were at least severely stressed. In Nyssen & colleagues' study (2003), the Belgian anesthesiologists did not report higher stress levels than did other working populations, but 40% of them were suffering from high levels of emotional exhaustion. In a recent review of stress and burnout among anesthesiologists, Nyssen and Hansez (2008) concluded that anesthesia is a stressful occupation. However, it was difficult to compare these studies on stress levels, since only a few studies used the same questionnaire. This can partly explain the differing results in the British and Belgian studies.

Stress among other physician groups is not rare either. In a U.K. study, high stress levels occurred in 14 to 18% of the general population and in 17% of medical practitioners, with no real difference noted between these groups (McManus et al. 1999). In a Canadian survey, 46% of physicians reported medical practice to be very or extremely stressful (Henry 2004). In Töyry's study (2005), young Finnish physicians had more stress than did their seniors.

Work was the greatest and combining work with family the second greatest source of the anesthesiologists' stress according to the respondents in this (I) and the previous Finnish physician study in 1997 (Töyry et al. 2000). The biggest worries at work in the present study were: 1.) general workload and time constraints, especially being on call, 2.) work atmosphere and organizational problems, and 3.) responsibility for and fear of harming patients. Stress was positively correlated with being on call. The results indicating high stress levels among Finnish anesthesiologists and reasons for stress are in line with international findings among anesthesiologists (Seeley 1996, Dickson 1996, Cooper et al. 1999, Jackson 1999, Kluger et al. 2003, Nyssen and Hansez 2008). According to the 11th World Congress of Anesthesiologists, anesthesiologists worldwide suffer from unmanaged stress (Jackson 1999). Conversely, whereas "anesthesia is becoming safer for the patient, it is becoming more dangerous for its practitioners" (Jackson 1999).

According to Töyry's thesis (2005), based on the 1997 Finnish physician study, young physicians reported as the most stressful work factors workload and lack of skills and consultation possibilities. Reasons for physicians' stress, in addition to workload, involve recent changes in

the practice of medicine that lead to a decline in autonomy and force a physician to act against his/her value system (Shanafelt et al. 2003, Wallace et al. 2009, Cole and Carlin 2009). Facing emotionally charged situations and excessive cognitive demands when processing overwhelming amounts information were also sources of stress. This kind of excessive stress may affect, in addition to the physician's health, "his/her humanity, ethical fiber, and moral integrity" (Jackson 1999).

A Cochrane meta-analysis showed that health-workers' occupational stress is connected to high expectations, insufficient time or skills, or low social support at work or a combination of these (Ruotsalainen et al 2008). Person-directed interventions, such as the cognitive-behavioral approach and relaxation techniques and work-directed interventions, can be effective in reducing stress and burnout and related symptoms.

6.1.2 Burnout

Burnout occurs fairly frequently among workers in human services where the work requires an intense involvement with people (Shanafelt et al. 2003). Evidence shows that burnout is a bigger problem among physicians worldwide than among the general population (Shanafelt et al. 2003, Cole and Carlin 2009, Wallace et al. 2009). International studies in which the MBI scale was used report burnout among 25 to 75% of physicians (Shanafelt et al. 2003, Wallace et al. 2009). They suggest that younger physicians have nearly twice the incidence of their seniors.

Burnout has been linked to the demoralization of medicine (section 6.2.1). According to Maslach and Leiter (1997): "Burnout is the index of dislocation between what people are and what they have to do. It represents an erosion in values, dignity, spirit, and will – and erosion of the human soul."

In Finland, more than half the workforce is suffering from stress-related symptoms, and 3 to 7% are severely burned out (Ahlberg et al. 2002, Kalimo et al. 2003a). The figures for all Finnish physicians in 1997 were 45% for moderate and 3% for severe burnout (Töyry 2005), but differences appeared between specialties, age-groups and types of employment.

Study I showed that moderate burnout is not uncommon (28%) among Finnish anesthesiologists. Nevertheless, even though the anes-

esthesiologists had high scores for emotional exhaustion, their professional efficacy scores were high. This can be explained by their long careers and good professional skills lowering the overall burnout indicator. Between 1997 and Study I, carried out in 2004, lack of professional efficacy had decreased significantly, from 51 to 17%. This was a surprisingly positive finding (Töyry et al. 2000).

When these indices of burnout were compared to those of other medical groups and the average population in Finland, anesthesiologists with a high on-call burden appeared to have scores in the higher range for emotional exhaustion (68%), and the lower range for the overall burnout indicator. However, for all anesthesiologists in Study I, only their cynicism was on the same level as among all physicians in 1997; all the other scores were lower among anesthesiologists (2004) than among physicians in general (1997) (Töyry et al. 2000). High cynicism might be linked to the fact that the anesthesiologist's job is less human than that of many other specialists.

According to a meta-analysis of the MBI scale, emotional exhaustion and cynicism are always correlated positively (Lourel and Gueguen 2007). Workload and time constraints, lack of work-related social support, and especially conflicts in the work-home interface have been shown to be related to the exhaustion component of the burnout, whereas lack of non-work-related support has been related to cynicism and reduced professional efficacy (Maslach 1996, van Hooff et al. 2005, Halbesleben 2006). Moreover, exhaustion can be seen as an indicator of ill-health (van Hooff et al. 2005). These findings are in line with the overall findings of Studies I, II, III and IV, except for the fact that professional efficacy was quite good among these respondents, the reasons for which are explained above.

According to one review article (Nyssen and Hansez 2008), approximately 40% of the anesthesiologists suffered from burnout, which agrees with our findings. On the other hand, the review claimed that stress is a lesser problem among anesthesiologists than is burnout. However, the measures of stress in different studies of the review were not comparable, thus the conclusions would be debatable. According to Study I, anesthesiologists had high stress levels, and their burnout was connected to stress and their on-call work burden. Emotional exhaustion and burnout (index) were augmented with the amount of on-call

duties. Exhaustion was also the most frequent of reported on-call-related stress symptoms.

Wallace & colleagues' review (2009) showed high burnout scores among western physicians in general, but among Latin physicians, especially anesthesiologists, burnout seems less common: In a study done among 11 530 Spanish-speaking health workers, burnout (MBI) was less prevalent (2.5–5.9%) among Central American than among Argentinian (14.4%) or Spanish professionals (14.9%), among nurses (7.2%) *vs* physicians (12.1%), and among anesthesiologists (5%) *vs* emergency physicians (17%) and internists (15.5%) (Grau Martin et al. 2009). Clearly, burnout varies among cultures. Job satisfaction, older age, having children, the perception of feeling valued, and optimism, are protective. The latter two items and high social support in “high touch” Latin cultures may be these key factors explaining the differences in the results (Maslach et al 2001). In Australia too, anesthesiologists had lower burnout indices (20% perceived high emotional exhaustion) than did other specialists (Kluger et al. 2003). This may be in part explained by the fact that anesthesiologists usually do not have a heavy paper workload that they would need to continue with after regular working hours. Work stops in most cases once they have passed the beeper to a colleague. Belonging to and sharing one's work with a group, might also protect the operating room staff from burnout. Most stressful clinical situations are worked out together with the staff.

Töyry's as well as a recent Italian study suggested that psychiatrists had higher levels of burnout than did other physicians (Bressi et al. 2009, Töyry 2005).

Among young physicians, burnout was related not only to lack of working skills, but also to lack of job control, too high commitment to work, lack of consultation opportunities, threat of legal action and violence, and dissatisfaction with their choice of profession (Töyry 2005). According to Schaufeli and Enzmann (1998) and Maslach et al. (2001) burnout is associated with lack of support from colleagues and especially from supervisors, and with low job control and organizational injustice. In Saleh's study (2009) early warning signs for burnout were withdrawal, irritability, and family disagreement. A strong sense of coherence protected against burnout in a longitudinal Finnish study (Kalimo et al. 2003a).

No clear comparison between the studies, even those using the same MBI scale, is possible since different studies use different criteria (e.g., only the percentage of exhaustion) in reporting burnout. This study, like Töyry's Finnish physician study, in addition to the three dimensions of the MBI, used Kalimo's composite syndrome indicator (section 4.2.3) (Kalimo et al. 2003a).

6.1.3 On-call burden and stress symptoms

Recent studies have highlighted the impact of physicians' on-call duty (Nicol and Botterill 2004, Lockley et al. 2006, Malmberg 2007, Mion et Ricouard 2007, Rauchenzauner et al. 2009) on their well-being and health, with much evidence of the effect of sleep deprivation on health and even on lifespan (Dinges et al. 2005, Megdal et al. 2005). While there is no doubt that physicians work long hours and experience chronic sleep deprivation over many years, the consequences for the physician's own health have still not been thoroughly studied. Emphasis has been placed upon the impact of physician's sleep deprivation on medical decision-making and patient safety (Howard et al. 2002, Arnedt et al. 2005, Dawson and Zee 2005, Landrigan 2005, Gander et al. 2008).

Being on call was among the most frequently mentioned *stressors* both in Study I and in the 1997 study with reference to workload and time constraints. Being on call may be stressful not only because of sleep deprivation, time constraints, and excessive workload, but also because of the unpredictability of the work, lack of opportunities for consultation, and the negative impact on family and social life (Nicol and Botterill 2004). Difficulties in ensuring nutrition, hydration, and bathroom breaks may also aggravate the on-call stress experience (Jackson 1999).

The *on-call burden* of anesthesiologists was the highest of all physicians in 2004 when the Study I data were compared with the study of all specialists done by the Finnish Medical Association. According to it the anesthesiologists had the greatest number of on-call active hours (12.5 hours a week) of all specialists. Total weekly working time for anesthesiologists (II) *vs* all physicians (Elovainio et al. 2007) was on average 60 *vs* 43 hours. These results (I, II) are in line with the most recent Finnish physician study done in 2006, according to which the anesthesiologists *vs* all physicians had on average 48 *vs* 24 active on-call hours a month

(Heponiemi, personal communication). The mean on-call period in Study I lasted for 24 hours (range 14–38 hours). According to Jackson (1999) anesthesiologists may work (on-call hours included) up to 120 hours per week. In a Canadian study, the medical trainees' mean shift duration was 25.5 hours (range 24–27 hours), and they worked on average 69 hours (range 55–106 hours) per week (Parshuram et al. 2004). Study I findings support previous findings according to which on-call workload is a general cause of stress for anesthesiologists (Dickson 1996, Cooper et al. 1999, Jackson 1999, Nyssen and Hansez 2008).

On-call duty and related stress symptoms were studied for the first time on a large scale (I). Being on call strongly correlated with various *stress symptoms*. The symptoms increased with higher on-call workload and almost disappeared during vacations. These results are supported by a more recent study on Finnish physicians, which showed that having a minimum of 40 active on-call hours per month was associated with high stress levels (Kouvonen et al. 2008). Here, anesthesiologists reported most often having mental and somatic symptoms, followed by cognitive and behavioral symptoms. In a study among U.S. physicians, sleep deprivation had the greatest impact on mood and cognitive tasks and a smaller but still significant impact on motor tasks (Weinger and Ancoli-Israel 2002). We found the most frequent somatic symptoms to be arrhythmias and dyspepsia, a result supported by shift-work studies (Waterhouse 1992). According to a French study in medical doctors, overnight duty impairs behavior, activity while awake, and sleep (Dru et al. 2007). A meta-analysis showed a reduction in cognitive performance after a 24- to 30-hour on-call period equivalent to IQ 70 (Philibert 2005). This study (I) showed an association between being on call and self-reported cognitive and mental disorders – such as memory disturbances, difficulties of understanding speech, falling asleep during activity, exhaustion, irritation, and self-destructivity. The incidence of many symptoms within each individual was 8 to 10 times as high when on call as when on vacation: nausea, coordination disturbances, exhaustion, dizziness, difficulties in understanding speech, and tremor. Women had significantly more symptoms than men. They also suffered more frequently than men from feeling cold, from peripheral oedema, and guilty feelings. Also in Hotchkiss and Early's study (2009) among 1239 US physicians, women had more stress and psychiatric problems than

did men, whereas men *vs* women had more behavioral and substance abuse problems.

These kinds of stress symptoms when repeated or prolonged are signs of impairment of essential organ functions. The exact mechanisms leading from perceived stress to symptoms and objective diseases are still unclear, but the human defence system when exposed to longstanding stress undergoes changes in interlinked endocrine, immune, and nervous pathways (Blanchard et al. 1998, McEwen 1998). Our subjects had on average been on call – and exposed to stress – for nearly 20 years, making it reasonable to assume that they might have developed chronic stress-related diseases over time. Moreover, on-call symptoms were associated with sick leave (I).

Our results are supported by the recent finding of an association between physicians' on-call duty and the neuro-endocrine stress response and increased risk for cardiovascular disease (Malmberg 2007, Mion et Ricouard 2007, Rauchenzauner et al. 2009).

The present study reveals that *younger* anesthesiologists had more on-call symptoms than did their older colleagues. One explanation is their higher on-call workload compared to that of older colleagues. Lack of skill and fear of harming patients might be another explanation (Töyry 2005). In a US study, a night call was equally stressful for all age groups, but reasons for stress differed between age-groups: Younger anesthesiologists were stressed because of production pressure, and interpersonal relationships, whereas the causes for stress in older colleagues were declining health and physical limitations (Travis et al. 1999).

In Nicol and Botterill's review (2004) of on-call work and health among different occupations, being on call from home was stressful because of its unpredictability, the obligation to plan lives around the on-call schedule and to limit behaviors such as alcohol drinking and travel. On-call work had a big influence on employees' lifestyles and interactions with family members and friends. Some doctors spoke about night calls "perturbing their family life and wrecking personal intimacy". Being on call from home was stressful not only for the employee but also for the family, and the negative effects of calls influenced their off-call lives. Having as a minimum one call per week was connected to "somatic" anxiety and depression among general practitioners, which results were in line with ours. A lack of personal safety was also reported to be an

issue among British anesthesiologists. That review, as well as, this thesis (I,II) highlighted gender differences in experiencing and coping with on-call stress.

The most recent Finnish physician study showed that on-call burden was connected to life-style risk factors such as smoking, heavy drinking, overweight, and low physical activity (Kouvonen et al. 2008). For our doctors (I), being on-call was related to a need for sleeping medicine, for bulimia, and need for alcohol.

6.1.4 Sleep, sleep deprivation, and sleep disturbance

Long ago, sleep was defined as the intermediate state between wakefulness and death, wakefulness being regarded as the active state of the animal and human functions, and death as that of their total suspension (MacNish 1834). Nowadays we know that sleep is not simply an absence of being awake, but a dynamic, circadian, and diurnal behavior, a special activity of the brain essential for health maintenance. Everyone's sleep requirement is unique. Sleep homeostasis is influenced by various neuro-immuno-endocrine systems, ones in turn intimately associate with sleep.

Sleep deprivation causes changes in immunity, and metabolism, in the autonomic nervous system and in hormonal function and pain perception. It is linked to diseases such as musculoskeletal disorders, type II diabetes, obesity, thyroid dysfunction, arterial hypertension, coronary heart disease, chronic infections, and to cancers such as breast cancer and non-Hodgkin lymphoma (Meier-Ewert et al. 2004, Dinges et al. 2005, Megdal et al. 2005, Van Cauter 2005, Lahti et al. 2008). It affects coordination, cognitive performance, especially vigilance, reaction time, planning and creativity, and makes one prone to mental disorders such as depression, anxiety, aggressiveness, loss of self confidence, and suicidal tendencies. It may lead to unhealthy behavior, such as high alcohol consumption and smoking, and may raise the risk of being involved in an accident (Hyypä et al. 1991, Weinger and Ancoli-Israel 2002, Meier-Ewert et al. 2004, Dembe et al. 2005, Dinges et al. 2005, Megdal et al. 2005, Van Cauter 2005). Both short and very long sleep is associated with higher mortality (Dembe et al. 2005).

Neuropsychological deterioration of the sleep-deprived physicians has been at the same level as that from moderate alcohol intoxication

(Dawson and Reid 1997, Howard et al. 2003, Arnedt et al. 2005, Dawson and Zee 2005). Only two hours' sleep debt each night for a week can reduce cognitive performance to a level equaling one full night of wakefulness (Powell et al. 2001). In Howard's study (2002) anesthesia residents' daytime sleepiness in both baseline and post-call conditions was comparable with that recorded in clinical sleep disorders. They also appeared to have a short sleep latency (2 min *vs* 10 min in controls), comparable to that of narcolepsy patients. Despite all this knowledge, the physicians' culture seems to deny and ignore the adverse effects of sleep deprivation, especially its effects on the physician him/herself.

Finland appears to be among the leading countries regarding insomnia and sleep disturbance rates (Ohayon and Partinen 2002). Some 10% of the population has been reported to suffer from clinical sleep disturbances shown to be linked to exceptional working schedules and to use of alcohol and medication (Ohayon and Partinen 2002). We found the same phenomena; perceived lack of sleep was associated with on-call burden and stress symptoms (I). Both genders slept a mean 7.0 hours. In another Finnish study, good sleepers slept on average 7.5 and bad sleepers 7.0 hours (Hyypä et al. 1991). Study I showed that only a good third of women and of those having the heaviest on-call workload slept enough, whereas the figure ranges between 65% and 80% among the general population in Finland (Sallinen et al. 2000). Age under 45, female gender and poor health, as well as being of working age, increased the risk for sleep debt among the general population (Sallinen et al. 2000).

The biggest reasons for sleep deprivation, according to Härmä & colleagues (2002), appear to be work stress and excessive workload. Younger women's sleep debt was also connected to family problems and middle-aged women's to hormonal disturbances, whereas men's sleep was insufficient for work-related reasons. Being on call was the greatest reason for the anesthesiologists' perceived sleep *deprivation* (I). Sleep *disturbance* was among the most frequently reported on-call stress symptoms. The most important forms of work-related sleep disturbances are insufficient sleep, sleep disorder related to night work, and insomnia due to work stress (Härmä et al. 2002, Ohayon and Partinen 2002). Being on call may contribute to all of these forms of sleep disturbance at the same time.

These findings, showing that on-call work contributes to significant sleep disturbance and deprivation, and this deterioration is more common among female anesthesiologists (I), are in good concordance with previous evidence.

6.1.5 Prevention of on-call stress

The most important improvement suggestions for the on-call system were shortening the on-call period and reducing the on-call frequency. Having an obligatory two days off per week, and setting an age limit on the obligation to undertake on-call duty were other suggestions (I).

These interventions are neither always possible nor sufficient to diminish anesthesiologists' stress levels, since on-call work in some form is inevitable in order to insure patient safety. A meta-analysis showed that working-hour limitations may improve residents' quality of life (Fletcher et al. 2005). The European Union has been formulating a new working-time directive, according to which physicians' working time would be limited to 48 hours (now 56 h) a week, and they would have at least 11 non-working hours in every 24 hours (Council Directive 93/104/EC. 1993).

Interventions attempted include reducing on-call frequency, shortening the on-call period, setting an age limit to on-call responsibility, limiting night work to strict emergencies, changing from an on-call system to shift work, and enhancing the use of technical equipment and nursing staff. Results of studies on the effects of various work arrangement interventions on physicians' well-being and patient safety have thus far been contradictory: In addition to positive effects, it has been argued that the changes may result in risks to the continuity of care, loss of quality of the physician-patient relationship, and of adequacy of education and training; they may harm the financial situation of the physician and the possibilities of combining work with family, and the physician's job and life satisfaction (Deitmer 2004, Parshuram et al. 2004, Breen et al. 2005, Nuthalapaty et al. 2006, Roey 2006, Landrigan et al. 2008, Volpp and Landrigan 2008). According to a review by the Harvard Work Hours' Health and Safety Group (Lockley et al. 2006), however, very few objective data support long on-call shifts.

Study V showed for the first time that good job control and organizational justice may be able to mitigate the effects of hospital on-call strain on the number of symptoms – and thus could help physicians better adjust to on-call duty. In Elovainio and colleagues' study (2001), a high sense of organizational justice appears to be linked to good health, especially among highly educated people with demanding jobs, high status, and responsibility: These results are in line with those of Study V.

6.1.6 Health problems

Self-rated health

Socioeconomic status is a significant determinant of health (Kunst et al. 2005). Since physicians belong to the upper social class, their mortality and morbidity is expected to be lower than those of lower classes. Physicians have, however, been reported to have an increased suicide risk (Lindeman 1997, Schernhammer and Colditz 2004, Tyssen 2007, Wallace et al. 2009), and depression is more common among physicians than among the general population (Tyssen 2007). However, studies on physicians' self-rated health, according to Baubinas (2009), are less common than are those of the general population, as if physicians neglect learning about their own health. In Töyry's study (2005) Finnish physicians suffered from several common diseases as often, or more often than did those in other fields. One Norwegian study reported physicians' physical health to be better than the health of those of a lower educational level, but their vitality and social functioning was worse than those of other university graduates (Stavem et al. 2001). According to a recent review article (Tyssen 2007) there are no health differences between physicians and the general population. In Study II, as well as in the two recent Finnish physician studies, three-quarters of the respondents perceived their health as being good or fairly good (Töyry et al. 2000, Elovainio et al. 2007). In a recent Lithuanian study involving 377 randomly selected physicians, 70.5% of male and 58.9% of female physicians described their health as very good or good (Baubinas et al. 2009).

Self-reported health in Studies I, II, and IV was connected to job and life satisfaction, work ability, and suicidality. Ill-health was also a reason for stress among 17% of these respondents.

In both the 1997 physician study (Töyry et al. 2000) and in Study II, 6% of the responding anesthesiologists felt that their health was fairly poor or poor. The figure was 4% for the physicians in general (Töyry et al. 2000). This small group should, however, receive attention, since according to the present study they are at a very high risk for suicidality (IV). In the Lithuanian study, 5.1% of female and 2.4% of male physicians ($p > 0.05$) described their health as poor (Baubinas et al. 2009).

Suicidality

Physicians, particularly anesthesiologists, commit suicide many times more frequently than do their patients (Lew 1979, Seeley 1996, Jackson 1999, Hem et al. 2000, Alexander et al. 2000, Hawton et al. 2001, Ohtonen 2002, Schernhammer and Colditz 2004, Hampton 2005, Agerbo et al. 2007, Wallace et al. 2009). One in four of our Finnish anesthesiologists reported having suffered from serious suicidal ideation. Based on the same questionnaire, the figures were 19% among all Finnish physicians in 2006 and 10% among the general population (Töyry et al. 2000, Elovainio et al. 2007). In a Norwegian study of medical students and young physicians, nearly half the respondents (43%) had at some point during their lifetimes suffered from suicidal thoughts, whereas the year before 14% suffered from suicidal thoughts, 8% had planned a suicide, and 1.4% had attempted it (Tyssen et al. 2001). In a Norwegian physician study the anesthesiologists were members of the specialty having significantly more serious suicidal ideation than did other physicians (Hem et al. 2000).

In Study IV, 2% of responding anesthesiologists had made serious plans to commit suicide, but none had attempted it. From 1984 to 2000, however, several-fold more Finnish anesthesiologists had succeeded in committing suicide during those years (Ohtonen and Alahuhta 2002). Compared to rates for other physicians and the general population, Finnish anesthesiologists had higher rates for suicide (17% *vs* 2% in the general population) and accidents (11% *vs* 5%) (Ohtonen and Alahuhta 2002, Statistics Finland 2006). The fact that the generation of anesthesiologists in Finland is so young that the first whole generation had not died yet (the normal deaths) by the timeframe of the study (Ohtonen and Alahuhta 2002), may contort the results. The reason for no unsuc-

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successful suicide attempts among Finnish anesthesiologists (IV) may be in their expertise in administering opiates or anesthetics and the availability of such drugs (Seeley 1996, Baird and Morgan 2000, Gold et al. 2005). Also the Norwegian physician study showed a lower attempt rate (1.6%) than successful suicide rate (4.9%) (Hem et al. 2000).

Study IV showed that suicidality among anesthesiologists was associated with work- and family-related and personal factors. Conflicts with colleagues was the greatest factor in work-related suicidality. In a recent study among Swedish and Italian female physicians, degrading experiences or harassment at work or both were connected with suicidal ideation (Fridner et al. 2009). Sexual discrimination, which still remains a problem among female physicians, might add to the gender-related suicidality reported in international studies (Jackson 1999). According to Kivimäki & colleagues (2001) poor social relations and low quality of teamwork had the greatest effect on sick leave among Finnish physicians but not among controls (nurses). In Study I, being on sick leave was associated with suicidality. Low *vs* high organizational justice doubled risk for suicidality (IV). These results (I, IV) are supported by findings of the Elovainio group (2002) among Finnish hospital personnel, according to which organizational justice is a predictor of psycho-social health. Those with many on-call-related stress symptoms had a 3-fold risk for suicidality compared to those with only few symptoms.

Family-related and personal factors related to suicidality were poor health, low social support, family problems, traumatic life events, lack of friends, and alcohol abuse and smoking (IV). Although most of the respondents enjoyed rather good health, those with poor health had a very high risk for suicidality. Good mental and physical health seems to be a key element against suicide (Schernhammer and Colditz 2004). Physicians' poor physical health has correlated with suicidality also in earlier studies (Sargent et al. 1977, Lindeman 1997).

Those with low social support were at a 10-fold higher risk for suicidality compared to those with high social support (IV). Most respondents reported having someone they loved who loved them in return, but only occasionally somebody who would transport them to the hospital when they were ill (IV). Worldwide, being female, single, divorced, widowed, or losing contacts with friends and becoming isolated, as well as having encountered adverse life events, are linked with suicidality or suicide

(Council on Scientific Affairs 1987, Sargent 1987, Olkinuora et al. 1990, Hem et al. 2000, Hampton 2005, Schernhammer 2005). Physicians committing suicide had fewer friends and less emotional support from spouses, children, parents, friends, and colleagues, noted one American study. They had lost emotional support during the previous two years and had also given less support to others (Council on Scientific Affairs 1987). According to Cornette's interpersonal-psychological model the increased suicidality of medical students and physicians is linked to "thwarted belongingness, perceived burden, and an acquired ability to engage in lethal self-harm" (Cornette et al. 2009).

Accumulation of various risk factors elevated the risk for suicidality (IV). Family- and personal life-related risk factors appeared to be greater risks for suicidality than were work-related factors.

Findings of Study IV are in line with those of international studies showing that a stressful working environment, poor mental and physical health, low social support, marital problems, and alcoholism are linked to suicidality and suicides of physicians (Council on Scientific Affairs 1987, Lindeman et al. 1996, Schernhammer and Colditz 2004, Stack 2004, Hampton 2005, Schernhammer 2005) and, as with our findings, smoking is linked to suicidality among the general population (Riala et al. 2009).

The higher stress levels related to higher on-call burden than among other physicians reported in Study I may be one explanation for the possibly higher mortality and suicide rates among anesthesiologists compared to other specialists (Lew 1979, Seeley 1996, Alexander et al. 2000, Hawton et al. 2001, Ohtonen and Alahuhta 2002). Being sued for malpractice has also been linked to anesthesiologists' high suicide rate in the US (Solazzi and Ward 1984).

The peak age for suicide among anesthesiologists has been around age 50 (Seeley 1996). It is possible that anesthesiologists lack a socially acceptable way of escaping from demanding clinical work when their health begins to deteriorate (musculoskeletal pain, cognitive disturbances after being on-call), and their career prospects begin to decline in middle age (McNamee et al. 1987, Seeley 1996). Age alone does not reduce performance, since clinical expertise increases with age, but correlates with other factors linked to quality of care (Jackson 1999).

Studies have also shown that exposure to traces of anesthetics and opioids in the air, knowledge of how to use drugs, and their availabil-

ity at work increases the risk for drug addiction and possibly suicide among anesthesiologists (Seeley1996, Baird and Morgan 2000, Gold et al. 2005, McAuliffe et al. 2006). In this study, however, suicidality was not significantly related to opioid use. Furthermore, because of some personal characteristics (being demanding, conscientious, critical, competitive, compulsive, neurotic, inflexible, individualistic, ambitious, having mood swings) physicians may be more vulnerable to suicide (Sargent et al. 1977, Reeve1980, Council on Scientific Affairs1987, Lindeman et al. 1996, Spear 2001, Schernhammer and Colditz 2004, Hampton 2005, Schernhammer 2005, Tyssen 2007).

Depression

According to Litman, physicians have a higher prevalence of psychiatric disorders than does the general population, but their symptoms seem to be milder (Sargent et al. 1977, Litman 1987, Hampton 2005, Schernhammer 2005). As to anesthesiologists, the professional burden comprising elements such as a stressful working atmosphere, heavy professional demands, long working hours, being on call, little vacation time, and conflicts between work and personal life may well lead to social isolation and depression (Kessler et al. 1999, Hem et al. 2000, Spear 2001, Stack 2004, Schernhammer and Colditz 2004, Schernhammer 2005).

In Study IV, of the anesthesiologists who had ever suffered from suicidality, only one in four reported having frequently suffered from depression during the last year. Kessler's questionnaire used in this study has, however, good concordance with psychiatric diagnoses, in particular, major depressive episode, general anxiety disorder, post-traumatic stress disorder and alcohol dependence (Bernal et al. 2007). On the other hand, one large European study finds depression not always to be linked to suicidal ideation or to suicide (Casey et al. 2008). In Study IV almost all who had depressive symptoms reported having suffered from suicidal ideation; use of antidepressants was, moreover, highly correlated with suicidality. Perhaps some in fact failed to recognize their depression, or the respondent had recovered from suicidality or depression or both before the time frame of the question. According to Hampton (2005), physicians often fail to adequately diagnose depression in themselves or in their patients. Others find, however, many physicians' being aware of

their problems, but being reluctant to seek help because of lack of time, lack of confidentiality, stigma, fear of exposure through their academic record, and fear of reprisals such as losing a medical licence or being sued for malpractice (Council on Scientific Affairs 1987, Sargent 1987, Hampton 2005, Schernhammer 2005). In one American study, fewer than half of the doctors committing suicide were at the time consulting a mental health professional (Council on Scientific Affairs 1987). A previous suicide attempt, verbalization of the intention, self-prescribed drugs, and financial losses markedly elevated the probability of suicide.

6.1.7 Health behavior

Unhealthy behavior, such as smoking, heavy or binge drinking, use of drugs, unhealthy eating habits, physical inactivity, and obesity, are well-known risk factors for cardiovascular diseases (Chahoud et al. 2004, Hu et al. 2004, Ezzati et al. 2005). According to Laaksonen & colleagues (2002), various behavioral factors are both independent of and partly interrelated with smoking, appearing to determine the co-occurrence of other behaviors in the general population. Stressed, isolated, and depressive physicians might seek relief by smoking and using alcohol and drugs (Sargent 1987, McAuliffe et al. 2006), and they may be insufficiently motivated to exercise and eat optimally and in a healthy manner. The Finnish physician study carried out in 2006 showed that on-call burden was connected to life-style risk factors such as smoking, heavy drinking, overweight, and low physical activity (Kouvonen et al. 2008).

Anesthesiologists are known to have a higher rate of substance-use disorders – especially of opioids – than do other physicians (McAuliffe et al. 2006, Skipper et al. 2009). In this study, 3.8% of respondents reported using opioids (unpublished data), but the reason for the use was not included.

Tobacco use

Smoking has been one of the most essential preventable risk factors for morbidity and mortality in developed countries (Neubauer et al. 2006). Smoking rates among physicians internationally have been lower than among the general population, a fact linked to their lower overall death

rates (Carpenter et al. 1997). In Study IV 8.3% were smoking and 0.6% chewing tobacco daily, and 17% doing this either daily or occasionally, whereas according to the latest Finnish physician study (Heponiemi, personal communication), of all physicians only 4.6% were smoking daily. Among all Finnish employees in 2007, the figures for daily smoking were 25% for men and 17% for women, and 2% and 1% for chewing tobacco (Statistics Finland 2008). In Study IV smoking or chewing tobacco daily or occasionally was connected to suicidality, which results are supported by international studies (Riala et al. 2009).

Alcohol consumption

In a large U.S study, heavy alcohol consumption was related to all-cause mortality, while moderate drinking slightly reduced mortality (Thun et al. 1997). In Finland, alcohol-related diseases or intoxication was, for the first time, the leading cause of death among those of working age in 2006, even though Finland's rating in absolute alcohol consumption was no longer among the highest in the world (European Community 2005). This can be explained by binge drinking. In a Finnish physician study from 1997, anesthesiologists and surgeons were the greatest consumers of alcohol compared to other physicians (Töyry et al. 2000). Thus, it is perhaps not surprising that one in four of our anesthesiologists (IV) had had six or more hangovers during the past year. These, *vs* those with fewer than six hangovers a year had a three times as high risk for suicidality. These results are supported by international studies (Watts 2008) and by the fact that most suicides among the Finnish general population are committed under the influence of alcohol (Pirkola et al. 1999).

6.1.8 Sick leave

Sick leave serves as an indicator of poor health among employees (Kivimäki et al. 2003b). Among physicians, the threshold of taking sick leave is high (McKevitt and Morgan 1997). They are often unlikely to seek medical help when they have a health problem. They are known to work when sick and self-medicate instead of accepting the role of a patient, taking sick leave, and allowing themselves to be treated by another professional (McKevitt and Morgan 1997, Wallace et al. 2009).

Reasons for this have been found in their high work ethics, lack of time to look after themselves, lack of trust in another physician's capability to help, and fear of losing a job (Sargent et al. 1977, Lindeman et al. 1996, Schernhammer et al. 2004, Hampton 2005). This behavior might also be linked to their coping strategies, such as denial and avoidance, and to the often demanding and narcissistic personality traits of physicians (Sargent et al. 1977, Reeve 1980, Schernhammer et al. 2004, Tyssen 2007, Wallace et al. 2009) and to their organizational culture (McKevitt and Morgan 1997, Cole and Carlin 2009): According to a Finnish physician study done in 1997, especially elderly male physicians and private practitioners seldom take sick leave, but once they do, the sick leave is likely to be long (Töyry 2005).

In Study I, as in the 1997 physician study (Töyry et al. 2000), close to half the anesthesiologists had been on sick leave during the year. In 1997, the anesthesiologists were among the physicians with the greatest sick leave frequencies (48%), whereas the surgeons had among the smallest frequencies (24%) (Töyry et al. 2000). In our study (I) the mean length of sick leave was 11 days (range 1–110) (unpublished data). Sick leaves lasted a minimum 3 days among half the respondents (unpublished data). Moreover, 96% of the respondents had been working when sick (unpublished data). The most frequently described reasons for having worked when sick include the following unpublished data: No one was available to cover for the sick anesthesiologist, so operations would have needed to be cancelled or postponed. The work-burden of the colleagues would have become too large if the sick anesthesiologist had been absent. Furthermore, according to a recent review (Wallace et al. 2009), doctors work when ill and expect their colleagues to do so, even though they would not expect their patients to behave in the same way. In a British study of 1339 physicians (McKevitt et al. 1997), over 85% of all respondents had “worked through” illness. Barriers to sick leave, as in our study, were organizational and cultural, based on attitudes toward their own health. The researchers concluded that doctors should be encouraged to take sick leave in order to improve their own health.

Study I showed that sick leave was related to on-call burden and related stress symptoms, an association perhaps reflecting the fact that symptoms may be indicators of ill-health, and being on call may be connected with diagnosed diseases. This is in line with a large Finnish

hospital physician study, in which sick leave was strongly associated with health problems, and the threshold for taking sick leave was high (Kivimäki et al. 2001). According to the Kivimäki group (2001), poor teamwork related to the sickness absenteeism of hospital physicians even more than did traditional psycho-social risks, such as overload and low job control, or previously diagnosed chronic diseases such as arterial hypertension or diabetes.

6.1.9 Job satisfaction

“Job satisfaction comprises positive attitudes held by an individual toward his/her job” (Buciuniene et al. 2005). Having high job satisfaction causes one to care about the quality of his/her work, to be more productive, and to feel responsible for the work environment, thus reducing employee turnover and absenteeism, and reducing organizational costs. Faragher & colleagues’ meta-analysis (2005) showed the importance of job satisfaction in maintaining employee health. According to one review (Williams and Skinner 2003), during the last decades a decline has occurred in physician job satisfaction. Continuous changes in the health care system have, importantly, affected the physician’s key relationship – the physician-patient interaction. The review confirmed that physician job satisfaction is associated with job turnover and physical and especially mental health. In addition, negative attitudes toward the health care system and medical profession among the general population were correlated with physician job dissatisfaction. Moreover, the authors concluded that job satisfaction may influence quality of care and patient relationships.

According to two more recent reviews, physician job satisfaction correlates positively with professional autonomy, communication, respect, health, diversity at work, involvement in teaching, and salary; and negatively with work overload, lack of time, lack of recognition, administrative tasks, and problems with combining work with family (Buciuniene et al. 2005, Van Ham et al. 2006). The latest review concluded that physicians enjoy the content of their work, but some employment conditions seem to reduce enjoyment (Van Ham et al. 2006). In Kinzl and colleagues’ study (2005) high job satisfaction correlated with interesting work demands and the opportunity to contribute skills and ideas,

and with high job control and decision-making. Study II supports these findings, since job satisfaction was associated with job control in both genders, with organizational justice among men, and with health among women. Injustice led to elevated risk for psychological distress among male physicians also in another Finnish study (Sutinen et al. 2002). One explanation of gender differences may arise from distribution of positions, because a sense of organizational justice may be crucial for those doctors (still predominantly men) who have risen to have administrative and economic responsibilities.

Lack of organizational justice and job control has been linked not only to job dissatisfaction but has also predicted higher morbidity as well as mortality (Kaplan et al. 1996, Theorell et al. 1998, Elovainio et al. 2006). Elovainio's group (2001) found the effect of job control on job strain and dissatisfaction to be mediated by justice evaluations and concluded that "part of the effect of job control on health stems from its ability to alter the perceived sense of trust and the quality of everyday decision-making in organizations."

A historical perspective may reveal how job control can relate to anesthesiologists' job satisfaction: Until quite recently they have been regarded merely as surgeons' assistants, but now play a multifaceted role, in which they have become more independent than before, and their professional efficacy has improved (I). However, that their time schedule still depends on surgeons' or other specialists' schedules, reduces their professional control and efficacy. According to one Belgian study, the professional image anticipated by anesthesiologists was connected to their job satisfaction (Lederer et al. 2004). Significantly more anesthesiologists had a low rather than a high self image. They also assumed that other specialists and lay people had a low rather than a high image of them.

The Cooper and Klueger group studies (1999, 2003) showed that most important in determining anesthesiologists' job dissatisfaction were perceived lack of professional control, long working hours, and communication problems between the hospital staff. For Italian anesthesiologists one study showed an association between job dissatisfaction, heavy physical load, and stress disorders (Basso et al. 2000). Study I showed that the majority of Finnish anesthesiologists felt stressed and 35% moderately and 10% severely exhausted. Anesthesiologists according

to Study II appear to tolerate stress surprisingly well, since they enjoyed fairly good job satisfaction despite high stress levels. Perhaps the meaningfulness of being able to help patients, to receive immediate feedback, and the respect shown to the physician's profession buffer them against work-related stress (Kluger et al. 2003, Van Ham et al. 2006).

In the Finnish physician study from 1997, the anesthesiologists were, on average, less satisfied with their jobs than were the other physicians (Töyry et al. 2000). According to Kluger et al. (2003), Australian anesthesiologists were quite satisfied with their jobs. In their qualitative study, clinical work was rated as causing the least problems. Supportive work and social environment mitigated a stressful work life, which results support Karasek's and Theorell's DC-social support model. In Harms and colleagues' study (2005), male-dominant surgeons had high job satisfaction despite burnout, stress, and health problems. Half the surgeons had health problems by age 50, such as alcohol dependency, substance abuse, depression, suicidal tendencies, severe work stress, and burnout with a retirement rate of 20%, but personal traits, life events, and coping skills in the work environment appeared to translate into professional satisfaction. In a recent study among Ugandan health workers, less than half the respondents were satisfied with their work, and doctors were the least satisfied (Hagopian et al. 2009). The most important contributors to job satisfaction were similar to those in the developed countries: job matched with one's skills and experience, a satisfactory salary, satisfaction with one's supervisor, a manageable workload, a stimulating job, and job security. Older employees were more satisfied than younger ones.

There exist very many studies on physician job satisfaction, both quantitative and qualitative, but sample sizes also in many quantitative studies are small ($N < 200$), measures are often not standardized, analyses applied are not more advanced than correlations, and a well-developed theoretical model is in most cases lacking. These aspects make comparisons between studies difficult and meta-analyses in most cases impossible.

6.1.10 Work ability

Work ability can be defined as “the physical and psychological capacity of a person to perform ordinary, remunerative work” (Reiso et al.

2000). In Study II work ability correlated with health and job control for both genders. Among women work ability was negatively correlated with family problems. These results accord with Ilmarinen's model of work ability in which health is the basis, and family, values, attitudes, and motivation also play important roles (Ilmarinen and Tuomi 2004). However, organization is the key environment which connects individuals to their work. In Ilmarinen and Tuomi's longitudinal studies (2004), poor organization had the same negative effect on work ability as do too high physical demands and dangerous work environment. High control has been shown to aid in coping with stress only if supervisors were considerate.

Studies on work ability among physicians seem to be sparse. Anesthesiologists in Study II perceive their work ability as slightly worse than does the average Finnish worker, according to the results of a recent population-based cohort study (Gould et al. 2006). These results are somewhat contradictory to those of a study in which Finnish physicians had the best work ability compared with other professional groups (Tuomi et al. 1991). Perhaps one explanation for the recent results is that physician's work in modern medicine has become more stressful than work in other occupations (Shanafelt et al. 2003, Tyssen et al. 2007, Cole and Carlin 2009, Wallace et al. 2009). In the 2006 physician study the anesthesiologists had slightly lower work ability (8.4/10) than other physicians in general (8.6/10) (Heponiemi, personal communication).

6.1.11 Life satisfaction

“Life satisfaction can be defined as the product of a cognitive judgemental process that reflects the degree to which needs and life's expectations have been met and it is a comparison of aspirations with achievements in and judgements of life in terms of personal norms derived from experience“ (Cummins and Nistico 2002).

Despite the dehumanization of modern medicine (section 6.2.1) and disillusionment in the medical profession (Spear 2001, Shanafelt et al. 2003, Cole and Carlin 2009, Wallace et al. 2009), we lack of representative studies on physicians' life satisfaction (Tyssen et al 2007). Life satisfaction appears to differ significantly from job satisfaction. Personal traits, especially neuroticism, seem to be an important predictor of physician's

life satisfaction. However, there is limited knowledge about the relative influence of personal, family- and social life -related, and work-related factors on life satisfaction in general.

In this study (II), the work- (job contract, on-call workload, ordinary working hours, mental and physical workload, job control, organizational justice, social support) and personal (health, age) and family-related (domestic worktime, family problems, life events, social support) determinants of life satisfaction were examined. Among both genders life satisfaction was positively correlated with social support and correlated negatively with family problems. Among women, health was also correlated with life satisfaction, but men's physical workload was negatively correlated. A US study among one middle-aged general population, showed health to be the most dominant variable correlated with life satisfaction. Total social contacts and marital status, however, almost lacked or lacked any relationship (Palmore and Luikart 1972). Our findings accord with the Hueston group's findings showing that a supportive social network sharing our own values can provide an environment allowing us to be happy (Hueston 2006).

The 1997 physician study (Töyry et al. 2000) revealed that 90% of all respondents and 84% of the anesthesiologist respondents were satisfied with their lives. Study II showed a slight elevation in the anesthesiologists' life satisfaction compared to 1997. However, in the 1997 study, the anesthesiologists remained the least satisfied with their lives, and the occupational physicians the most satisfied (Töyry et al. 2000). According to the Koivumaa-Honkanen group (2005), life satisfaction in adult Finns in general has remained moderately stable for 15 years – 83% being satisfied. This level of subjective well-being has been sufficient to maintain work ability earlier, but the requirements of working life today demand higher satisfaction. Studied longitudinally, life dissatisfaction seems to predict poor health outcomes, morbidity, premature work disability, and mortality, even among healthy citizens (Koivumaa-Honkanen et al. 2005).

In Tyssen's et al. (2007) recent longitudinal study Norwegian physicians had lower levels of life satisfaction than an educationally matched group of the general population. Life satisfaction was its lowest at the end of medical school. Life dissatisfaction was associated with physical training, negative life events, mental (also work) stress, and lack of social support. Among situational factors, social support, both structural (hav-

ing a partner) and perceived, was the main predictor of life satisfaction. Over the years, however, personality traits, especially conscientiousness, clearly predicted life dissatisfaction. These findings support the results of this study (II) on the parts of the correlates of life satisfaction. However, we did not study personality traits. Moreover, in this study the main correlates of life satisfaction were individual and family-related.

The psychological theory of “flow” has been proposed as a model of life satisfaction (Shanafelt et al. 2003). As cited in the review article on the well-being of physicians by Shanafelt & colleagues (2003): “Individuals selectively cultivate a set of activities, values, and personal interests. When these interests provide opportunity for high involvement, deep concentration, intrinsic motivation, and a perception of facing high challenges while having adequate skills to meet them, an individual achieves flow – the optimal selection of activities to promote well-being.”

6.1.12 Job turnover

Job turnover has been shown to be closely related to problems in the well-being of physicians (Buciuniene et al. 2005). In Study III, 43% of Finnish anesthesiologists considered leaving their job. Conflicts with superiors and co-workers, lack of job control and justice, stress and burnout, and job dissatisfaction were all connected with turnover intentions even when considering the effects of physicians’ individual characteristics and family-related factors. These results are in line with a review article according to which a common contributor for job turnover is a misfit between physician’s expectations and organizational culture (Misra-Hebert et al. 2004). In Study III, conflicts with superiors and co-workers showed the strongest association with wanting to leave the career. These findings agree with those of earlier Finnish studies suggesting that problems in the workplace atmosphere and low quality of teamwork had the greatest effect on sick leave among physicians (Kivimäki et al. 2001). Even greater than the effect of overload, heavy on-call responsibility, poor job control, social circumstances outside the workplace, and health behaviors, was the effect of the problems experienced in social relations at work. Workplace atmosphere has even been shown internationally to be an important correlate of job turnover (Misra-Hebert et al. 2004, Wallace et al. 2009). Our results are also in line

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with recent U.S. ones, according to which relationship with colleagues was the most important factor associated with physicians' resignation intentions (Masselink et al. 2008).

Study III's findings that low job control and organizational justice are related to the desire to change jobs are in line with findings of many studies on the effects of job control and organizational justice on well-being and health (Theorell et al. 1998, Elovainio et al. 2001, 2002, Sutinen et al. 2002). According to Sutinen & colleagues (2002), poor justice at work raised psychological distress among Finnish physicians. In fact, the findings of Elovainio & colleagues (2002) suggest that among hospital personnel the effect of low justice on sick leave and psychological morbidity was stronger among physicians than among other occupational groups. Rodwell & colleagues (2009) have found that a combination of the DC-social support (work and non-work) model and the organizational justice model predict organizational commitment. According to them, strengthening supervisor and non-work support while enhancing perceptions of organizational fairness, may help in improving job satisfaction, commitment, and the well-being of health professionals.

In Study III, severely stressed respondents (13%) and those with on-call-related stress symptoms and/or sleep deprivation also had an elevated risk for wanting to change jobs. On-call stress and sleep deprivation were related only to willingness to change to a non-physician's job, a fact easily understood, because the on-call burden is present in almost every physician's job.

Apparently, this is one of the few studies on levels and correlates of job turnover intentions among anesthesiologists. The rate of willingness to change jobs found here is, compared to findings of international studies, in the higher range among physicians, but in this study the actual turnover rate was not studied, as in the international reference studies (Misra-Hebert et al. 2004). According to a review by the Misra-Hebert group, studies on physician turnover began about 1956. Turnover rates show a wide range, from 4% to 60%. The Finnish physician studies of 1997 and 2006 show that willingness to change jobs may have diminished slightly: 49% of the sample of all physicians and 56% of anesthesiologists were willing to change their profession in 1997 (Töyry et al. 2000). In 2006, in comparison, 37% to 40% of all physicians were thinking of changing their jobs,

with the figure for anesthesiologists being 32% (Elovainio et al. 2007, Heponiemi, personal communication).

In international studies, female physicians had higher job turnover rates than did men, due to their maternal leave (Goldacre et al. 2003, Joyce and McNeil 2006). A special feature of Finnish anesthesiologists is that half of them are women. However, in Study III no gender differences appeared in the outcomes. In Finland, mothers are not likely to stay permanently at home after having children, possibly due to a well-organized day-care system. However, this double or triple burden (taking the responsibility of work, home care, and being pregnant) of women may affect their decision whether to retain or leave their job.

Age, health, family, and social situation have been related to job turnover (Misra-Hebert et al. 2004, Joyce and McNeil 2006). In Study III, young age, poor health, not having care responsibility, and low social support were linked to desire to change jobs. In a Korean study, “workgroup friendliness and warmth” and role clarity buffered against job turnover intentions among physicians (Hwang and Chang 2009).

Senior anesthesiologists may, instead of changing their jobs, be interested in earlier retirement. In this study (unpublished results) the respondents on average wished to retire at 61. In a recent Australian study, 37% of their 178 general practitioners aged 45 to 65 years were willing to retire early (Brett et al. 2009). Declining job satisfaction, a diminished workforce, excessive workload, and increasing bureaucracy were linked to premature retirement intentions.

Structural and cultural changes in the modern medicine (see 6.2.1), may lead physicians to look for sources of satisfaction elsewhere – and leave their profession (Chew and Williams 2001).

6.2 General discussion

6.2.1 Today’s challenges in the medical profession

Lately, a continuing discussion has been taking place in the medical community: During recent decades together with the development of modern medicine, the physician’s work has become more dehumanized. New technologies and organizational changes, together with increased accountability have altered the doctor-patient relationship and medical

decision-making has become affected by non-medical factors that may have led to less optimal or unsafe practices. Subspecialized physicians know more about less. Doctors treat diseases, ignoring illness. Evidence-based medicine often does not take into account the individual suffering of the patient. Medical schools teach science but ignore the art of medicine and moral understanding. Bureaucracy takes over a large part of the research, and competition for research funding increases. Health care systems are often unjust and broken. Many hospitals have become huge, cold “marketplaces” where fewer personnel must take care of more patients (Jackson 1999, Spear 2001, Edwards et al. 2002, Shanafelt et al. 2003, Cole and Carlin 2009, Wallace et al. 2009). Physicians also confront increasing regulations, malpractice suits, and an expanding knowledge base (Shanafelt et al. 2003). Furthermore, physicians, especially anesthesiologists, work in emotionally charged situations associated with suffering, fear, failure, and death, which may culminate in difficult interactions with patients, families, and medical staff (Wallace et al. 2009).

Moreover, academic medicine has been accused of being inattentive to humanistic values, which has caused retention problems in the medical faculties (Lieff 2009). Professional development has been claimed to lack meaning, purpose, and professional fulfillment, and possibilities to reflect on these issues.

According to Cole and Carlin (2009): “Medicine is filled with many people of good will, integrity, and commitment who strive to provide compassionate and ethically sound care, teach and mentor students, maintain scientific standards of practice, keep current with the most recent literature in one’s field and undertake biomedical research.” Yet current conditions prevent physicians from living up to their requirements and ideals. This conflict is born when organizations ignore existing working conditions and rigidly enforce moral rules, doing ethical violence (Cole and Carlin 2009). “This may cause a cognitive dissonance among physicians, leading to disillusionment, self-doubt, dis-ease, and retreat from ideals.”

The contradictory fact that many physicians have lost sight of their own well-being – and think that illness has nothing to do with them – might worsen their situation. They work when ill and expect their colleagues to do the same. Moreover, with altruistic intent, physicians often place professional responsibilities above personal ones (Shanafelt

et al. 2003, Wallace et al. 2009). This kind of behavior has been connected to certain personality traits, such as perfectionism, neuroticism, workaholism, conscientiousness, ambitiousness, competitiveness, self-denial, emotional inexpressiveness, aversion to prolonged closeness in relationships (Jackson 1999, Schernhammer and Colditz 2004, Tyssen et al. 2007, Wallace et al. 2009). The effect of professional and personal factors on physicians' wellness is exacerbated by the tendency of many physicians to protect the privacy of their impaired colleagues (Wallace et al. 2009). Wallace & colleagues (2009) conclude in their review: "The culture of the medical profession has been recognized as a key factor that might deter doctors from taking care of themselves." According to Jackson's review (1999): "Throughout their education, training, and practice, physicians develop unhealthy work styles, unbalanced lifestyles, psychological inhibitions, and emotional unresponsiveness."

Against this backdrop, it is not surprising that physicians are unwell: rates of stress, burnout, anxiety, depression, and suicide have been reported to be higher than among the general population (Schernhammer and Colditz 2004, Cole and Carlin 2009, Wallace et al. 2009). Moreover, impaired physicians have also been shown to pose risks for patient care and negatively affect health care systems (Wallace et al. 2009).

These dehumanizing trends are evident worldwide especially in the western medical culture and affect as well the well-being of anesthesiologists whose job is more technical and less human than that of other physicians.

6.2.2 Recent changes in the work of an anesthesiologist

This survey was carried out in 2004. The results could be somewhat different today. Trends in working life favour, on the one hand, effectiveness and accountability and, on the other, counterbalancing variability and flexibility according to individual needs, e.g., health restrictions and work-and-family interface. Today an anesthesiologist's job may be more multifaceted, meaning more tasks outside the operating theatre, providing services for pre-operative assessment, pain management, doing research, teaching, and quality assurance activities. The anesthesiologist is today better respected as an independent agent, not only as a "technical performer" in the operating room.

In this study, there were respondents who were on an on-call rota until the age of retirement. Nowadays, more senior anesthesiologists may be liberated from the on-call rota. In 2004, only 1% of the respondents were working in private practice. Downsizing of municipal inpatient care and structural changes might have caused the flow of anesthesiologists to private hospitals. On the other hand, the economic crisis might have forced private hospitals to reduce their functions and turn the flow back to communal hospitals. The crisis has tightened business thinking, increased workloads, and reduced flexibility, which may have increased the stress levels of all hospital staff, including anesthesiologists.

During the study there were vacancies for anesthesiologists in the municipal hospitals but during the economic crisis, some anesthesiologists may be unemployed. In 2004 some anesthesiologists were working in municipal hospitals via companies that are selling health services. Young anesthesiologists have possibly chosen this type of employment contract so that they have more influence over their working conditions. The economic crisis, however, may have caused downsizing of this kind of purchased services.

The most significant effect of this study might have been that results of the on-call stress study seem to have stimulated several new studies around the world regarding on-call stress. The recommendations of Study I have been taken seriously: Since the time the present data were collected, some changes in the on-call system have taken place in Finland. Some university hospitals have organized a rota in which the on-call period is 13 hours as its maximum and 10 hours during the night (Alahuhta, personal communication). Some emergency polyclinics have introduced a “traffic light” system categorizing the patients into 3 groups according to their need for help (Kallio et al. 2006). The aim is to guide the less emergent cases to be treated during the daytime. With this *triage* categorization, the number of late-evening and night-time operations has decreased by 50%. Moreover, in many places some of the on-call services have been bought from medical consulting companies to avoid making the on-call burden too high for those in the posts.

As the proportion of female anesthesiologists continues to increase, combining work and family has become highly important in the profession. In order to make this combination easier, many anesthesiologists have increasingly during very recent years begun working part time

(Rosenberg, personal communication). In this study (I, III–V), 12% of the respondents (14% women, 11% men) were working part time and 9% (7% women, 10% men) were partly retired. Part-time work reduces the daily workload and most probably stress levels. On the other hand, along with the increase in part-time work there might not be enough anesthesiologists to do the daily work and cover the on-call rota and vacations; part time work could thus lead to increased stress among anesthesiologists.

According to the present Studies (I, II), in 2004, nearly half of the respondents were women working full time and having on-call duties as often as men. They were working under a less favorable job contract- and in a less favorable job control situation than were men, and their perceived strain was higher than among men. They were also taking the main responsibility for domestic tasks. Internationally, female physicians are not only taking the major responsibility for child-rearing and home-keeping activities, but “serve as primary caretakers during the illness of a parent, in-law, or husband” (Jackson 1999). In Finland after this study was carried out, more female, and also male anesthesiologists, than before have taken parental leave when a child is born into the family (Rosenberg, personal communication), which has most probably lightened the burden of female anesthesiologists. New possibilities for those in permanent posts of taking a sabbatical leave have been organized (Rosenberg, personal communication). Things seem to have changed for the better, but still the work situation of the female anesthesiologists deserves more attention.

Improvements have also been made regarding organizational problems (Rosenberg, personal communication): Development discussions have become obligatory, and young resident anesthesiologists’ management training has begun.

In 1997 a confidential network for physicians began to make it easier for physicians to find help in case they do not want to use formal health services (Kujala 1997). Nevertheless, many physicians seem not to dare to disturb these “confidential physicians,” do not trust them to understand the situation and to help, or are afraid that they will breach patient confidentiality. In this study, many anesthesiologists were still self-medicating themselves (unpublished data) without consulting another doctor. The

confidential network system needs to be improved so that a physician does not hesitate to turn to another physician in order to get help when having either physical or mental health problems.

6.3 Theoretical and methodological considerations

6.3.1 Theoretical considerations

The study results confirmed well the conceptual background. They also support the transactional approach to stress and strain (Lazarus and Folkman 1984), the theory of allostatic load (McEwen and Stellar 1993, McEwen 1998, 2002, 2007) and the DC-, and the DC-social support model (Karasek 1979, 1990, Theorell 1990). However, based on the results, a new stressor was found that was not in the original framework, “fear of harming patients”. Future studies should test this quantitatively and qualitatively, so that interventions to help in lessening this fear could be planned.

The results regarding connections of stress, on-call-related stress symptoms, and burnout fit the framework. The results regarding sick leave, willingness to change jobs, job satisfaction, work ability, and life satisfaction support the framework where these outcomes are seen, as manifestations of strain *vs* coping. The strain related to life satisfaction, according to these results, is mostly non-work-related, as could be expected.

Results regarding suicidality support the framework in which suicidality is the consequence of a highly stressful situation, and a manifestation of allostatic load, even though causalities cannot be shown in this cross-sectional study.

Job and life satisfaction and work ability were quite high in spite of high stress and burnout levels, relatively high sick leave frequency and low job commitment. Other variables not studied here, such as salary, appreciation toward physicians’ work, physician-patient relationship, ability to do demanding, skillful life-saving procedures, passion, working in line with one’s values, may buffer against strain among the anesthesiologists and should be studied in the future.

6 DISCUSSION

The model was operational and concentrated only on certain aspects of the work-related well-being of anesthesiologists. Many more factors could have been added. The focus when studying well-being could have been more on the resources and coping strategies of the anesthesiologists. Moreover, evaluative processes and intrinsic load are not studied here.

The results of the Studies (I–V) are illustrated in **Figure 4**; fear of harming patients as a part of anesthesiologists' workload and the correlations between variables shown with colored lines, each color corresponding to one main variable. The broken line means that the connection matters only for women (W) or only for men (M).

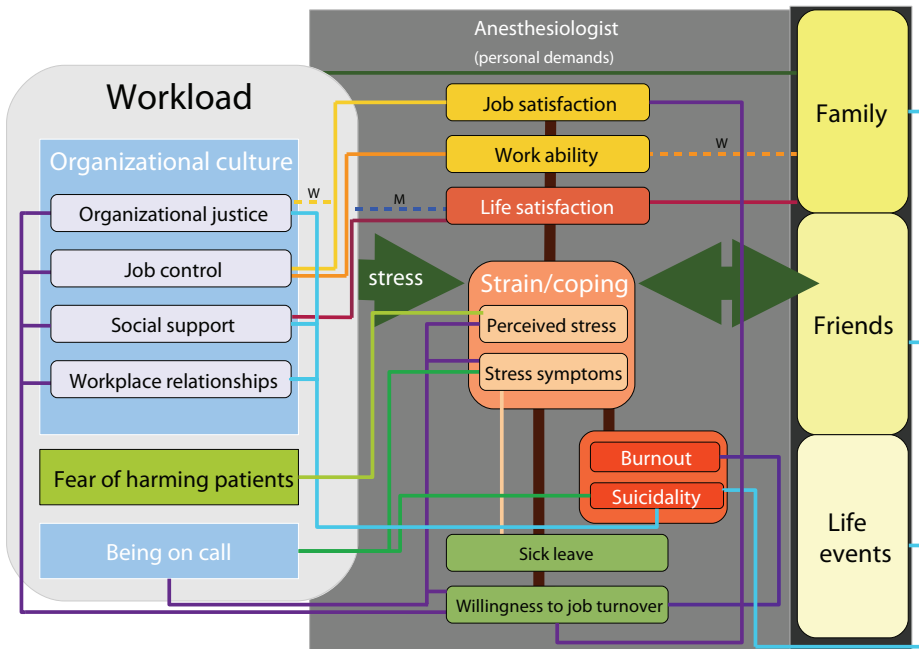


Figure 4. Results appear in the framework of the study: work-related well-being of Finnish anesthesiologists.

6.3.2 Methodological considerations

Representativeness, comparability, and anonymity

The strength of this study lies in its nationwide invitation to all specialist anesthesiologists. The overall response rate (60% of those who met the inclusion criteria) was fairly well acceptable for a postal survey in which difficult and delicate questions concerning depression, burnout, and suicidality were asked, and compares favorably with similar kinds of double mail-out questionnaire studies. From the point of view of sampling theory, however, a non-respondent rate exceeding 30% is certainly awkward. No difference emerged between respondents and non-respondents with regards to age and gender, but it would be unrealistic to assume that refusal (or not responding) is due only to random factors. While part of the refusal would be random, the remainder is probably biased toward the most stressed anesthesiologists as responding less often than others. This can be assumed to have diminished the means and variances of stress indicators and therefore also reduced their explainability.

The respondents represented practitioners from all clinical areas including public and private practice of all types. Those unemployed or retired were excluded. The university hospital anesthesiologists were a little over-represented, and the researchers were under-represented when compared to the data from all specialist anesthesiologists in 2004. This could be seen as an advantage, since most of the anesthesiologists having hospital calls work in university and central hospitals – and we were interested in clinical work and especially in on-call related well-being. Of particular interest was that a significant number of practitioners continued working in clinical anesthesia, having calls well into their late 60s (almost to 70) – unlike other specialists.

We used the same questionnaires regarding stress, burnout, self-rated health, sick leave, job satisfaction, work ability, life satisfaction, job turnover, suicidality, organizational justice, and job control as those used in national studies of Finnish physicians and the adult population, and in international studies – especially regarding burnout, self-rated health, suicidality, organizational justice. This made the comparisons between physicians and the employed general population nationally

and internationally possible. The exclusion of unemployed and retired persons from the study made the comparison possible with employed physicians and the general population.

Anonymity was ensured when the Finnish Medical Association sent the questionnaires to the participants and asked them to return them unopened to the Finnish Medical Association for coding. The coded unopened envelopes then went to the researcher from the Finnish Medical Association for data collection and analyses. The study was done according to the World Medical Association Declaration of Helsinki 1964, and the study plan was accepted by the Research and Dissertation Committee of the Medical Faculty of Helsinki University in 2001 and the Coordinating Ethics Committee of Helsinki University Central Hospital in 2008.

Reliability and validity of measures

Measurement of stress (I) relies on self-assessment which is prone to variation due to individuals' characteristics and perceptions (Kasl 1981). Studies have shown, however, that subjective assessments of strain or stress are significantly associated with physical stress markers (McEwen 2007).

Use of the Maslach Burnout Inventory (MBI) (I) was an advantage. It is a well-recognized, validated tool for assessing burnout. Several studies in other clinical areas can also be useful in comparing scores from this study.

The questions on self-reported health (I–V) and depression (IV) were based on the judgement of the anesthesiologists themselves. However, the reliability of these measures has been high (Lundberg and Manderbacka 1996, Idler and Benyamini 1997). In studying physicians, their own diseases diagnosed or treated by themselves must be included. One can assume that physicians can recognize their health problems easier than can the general population, since they have more knowledge of health issues than do other people. However, under- and over-reporting is possible.

No preliminary data assessment was available for the two sets of questions concerning perceived on-call symptoms and worries at work (I). Their calculated reliability coefficients (0.88–0.92) were good for

this kind of self-report assessment. The other questions were developed from existing measures. Validity of measurement can be inferred from correlations between dependent and independent variables of the whole data of the study. Findings agree with previous findings (Töyry 2005) for the parts of overall correlation matrix that can be directly compared, which reflects a relatively good level of validity.

The sum variables organizational justice, job control, and social support (II) were calculated from widely used established measures (Karasek 1979, Moorman 1991, Sherbourne and Stewart 1991, Elo et al. 1992, Aalto et al. 1995). Their reliability coefficients (0.89–0.91) were acceptable for this kind of self-report assessment.

Limitations of the study

Despite strengths in inclusion (all anesthesiologists included); representativeness by gender, age, and workplace; and comparability, anonymity, validity, and reliability, some caution is needed when interpreting the results. The study data has been collected for 5 to 6 years ago, and many things may have changed since that (section 6.2.2). The cross-sectional design of the study limits one in drawing inferences as to causal pathways. Inaccuracies may always occur when gathering data with questionnaires. Comparing data from different studies may include bias due to cultural or societal differences. The reporting may depend on several things, such as on subjects' motivation and their free time to complete the questionnaire. Since the survey was quite long, the respondents may have tired of answering questions, which might have affected especially the variance of the answers. Possibly, those who had no problems did not bother to participate in the survey. On the other hand, those who were very burned out or otherwise in bad condition might have been unwilling to participate in a project requiring about 2 hours.

The questions on symptoms were not necessarily answered during the call or when the respondent had been two weeks on a vacation, meaning that the answers may have been memory-dependent. Perceived symptoms may also have been influenced by negative affectivity, and individuals with subjective distress may have been more likely to perceive, over-react to, and complain about their sensations; with the opposite for positive affectivity. This makes comparison between individuals less

accurate. Job satisfaction, life satisfaction, and work ability are multi-dimensional concepts, and no single factor explains them. This is true also for burnout. However, single-item measures of job satisfaction and multi-dimensional measures of burnout have satisfactory predictive validity (Elo et al. 1992, Maslach 1996).

Willingness to change to another job was studied as a hypothetical situation. One study, however, showed that those considering leaving their jobs finally carried out their plan (Buchbinder et al. 2001). Although several variables were included in the analyses as correlates of job turnover, others such as physician-patient relationship, salary, parental leave, working abroad, career plans, and personal traits could have been added.

Some sensitive questions, for example, on depression, suicidality, and on the use of drugs, might have been difficult to answer, even in an anonymous survey, and the answers are subject to recall bias and denial. However, we used the same Kessler questionnaire (Kessler et al. 1999) in the present study as the one used in the Finnish physician studies (Töyry et al. 2000, Elovainio et al. 2007). It has been shown to have good concordance with psychiatric diagnoses (Bernal et al. 2007).

A special feature of Finnish anesthesiologists is that half of them are full-time working women and having on-call duties as often as men do. Most of them also take the main responsibility for domestic tasks. The female double-triple (pregnancy) burden may be reflected in our results of the study and explain not only the gender differences in stress response and sleep deprivation, but also the unexpected sick-leave differences between surgeons and anesthesiologists, since the surgeons are still predominantly males.

We are not aware of possible differences between the respondents and non-respondents. From the open narratives (not reported in this study) one might conclude that the anesthesiologists whose health was most affected by being on call had changed their working place or career in order to avoid the obligation to be on call.

7 MAIN FINDINGS AND CONCLUSIONS

7.1 Main findings

1. Work-related stress and exhaustion are common among Finnish anesthesiologists (I, V). The biggest worries at work are general workload and time constraints, the work atmosphere and organizational problems, and fear of harming patients. Being on call is one of the most important causes of their stress; anesthesiologists have the greatest on-call burden among Finnish physicians. Unlike other specialists they continue to have an on-call commitment until the age of retirement. On-call duty is the greatest reason for their perceived sleep deprivation. Being on call is significantly correlated with various stress symptoms such as nausea, coordination disturbances, exhaustion, dizziness, difficulties in understanding speech, and tremor. These symptoms are associated with take-up of sick leave. Women seem to be more affected by stress than are men (I).
2. Finnish anesthesiologists enjoy fairly high job satisfaction, work ability, and life satisfaction. However, the level of these well-being indicators seems to be somewhat lower among anesthesiologists than among other physicians. Job control and organizational justice are the most important variables in the work-related well-being of the anesthesiologists. Female anesthesiologists are in a less advantageous work and work-family situation (job contract, job control, domestic work burden) than are their male colleagues. However, no gender differences appeared in levels of job satisfaction, work ability, or life satisfaction, although work-related factors are slightly more important determinants of those well-being indicators in males, and family-related in female anesthesiologists (II).

3. Nearly half of the Finnish anesthesiologists consider leaving their jobs. The main reasons for these attitudes are conflicts at the workplace and lack of job control, and low organizational justice (III).
4. A quarter of the respondents have considered suicide. Work-related factors associated with suicidality are conflicts with co-workers and superiors, lack of justice at the workplace, and being on call. Family-related and personal factors are poor health, low social support, family problems, traumatic life events, lack of friends, alcohol abuse, and smoking. Family-related and personal factors seem to be more relevant risks than work-related factors (IV).
5. High job control and organizational justice may mitigate the effect of hospital on-call strain on the number of stress symptoms (V).

7.2 Conclusions

Job strain among anesthesiologists is high when measured by a variety of indicators, such as stress level, on-call burden, stress symptoms, exhaustion, sick leave, sleep deprivation, suicidality, and low job commitment. However, the anesthesiologists enjoy fairly good job satisfaction, work ability, and life satisfaction. This may depend on their good coping mechanisms in stressful situations.

The most important work-related factors associated with well-being are on-call burden, job control, organizational justice, and social relations at work. The work situation of female *vs* male anesthesiologists is disadvantageous. Among female anesthesiologists, factors outside work are more important than in men.

8 RECOMMENDATIONS

8.1 Recommendations for improvement of the well-being of anesthesiologists

8.1.1 Organizational interventions

In order to reduce the occupational stress of the anesthesiologists on an organizational level, interventions are needed to limit the on-call work burden, improve organizational culture – especially workplace atmosphere, organizational justice, and job control – and make it possible to combine work with family and social life.

On-call burden may be best reduced by limiting the number of shifts and shortening the on-call work period. Work arrangements such as limiting the night work only to emergencies and improving consultation possibilities could also reduce on-call-related stress. Liberation of the senior anesthesiologists after a certain age limit (50 years) and those with serious health problems, from any on-call-duty obligation would be recommendable.

Conflicts at the workplace can be reduced by various measures to establish trust, mutual commitment, effective communication, and building of individual relationships. Offering social support, showing respect and gratitude, being flexible, and maximizing the use of each individual's capacities and actual strengths might help in reaching those targets.

In order to increase anesthesiologists' job control, they should receive the possibility to affect changes made in daily tasks at work, order of the tasks, use of time, pace of work, working methods, division of tasks, decisions regarding co-workers, and the tools and machines worked with. All tasks need proper descriptions. The amount of work and hours of working should be limited in relation to human endurance.

Individual need for rest should be respected, and sufficient support organized. Predictability of the tasks should be maximized, and interruptions minimized.

The anesthesiologist's experience of organizational justice can be maximized if it is clear that decisions are made based on accurate information, incorrect decisions can be changed, everyone can express an opinion concerning decision-making related to the work, decisions made are consistent, effects of the decisions are investigated, information on the effects is delivered, and additional information on the grounds of the decisions is available.

Opportunities for a flexible integration of work with family life and for allowing time for personal life and recovery from work-related stress are also essential to ensure anesthesiologists' high life satisfaction. This requires promotion of a more flexible working culture and part-time options. What deserves attention is the enhancement of the disadvantageous situation of female *vs* male anesthesiologists regarding job control, permanent job contracts, domestic workload, and related strain.

Emphasis should be placed upon improving superiors' leadership skills. Conversations, mentoring, and external counseling – with the support of the occupational health care system – should form a natural part of workplace problem solving.

Regular annual assessment of job and life satisfaction, as well as of stress levels and perceived health and their connection with relationships between superiors and colleagues, and one's involvement with organizational decision-making and career development is necessary at the workplace in coordination with the occupational health care system. Employers could become more motivated in organizing these assessments and possible interventions, if their focus was on physician wellness as a quality indicator of the health care system (Wallace et al. 2009).

8.1.2 Occupational health care and professional interventions

The physicians' health care system needs to be organized so that it is of high level, confidential, and available for all physicians regardless of the workplace, working time, job contract, or the position. A pre-employment health check-up by an occupational physician and periodic health examinations (every 5 years) with increasing frequency with advancing

age (every 3 years) should be organized for all physicians, but especially for the anesthesiologists, because of their highly stressful job. It would be of utmost importance for health care professionals to recognize suicidal physicians. A screening health questionnaire including suicidality together with known risk factors including those reported in this study could be used at all occupational health check-ups and when needed during other visits to the occupational physician. The focus should be upon any accumulation of risk factors. Work-place risk assessments should concentrate not only on chemical exposures or ergonomic problems. Much more emphasis is needed on the mental burden linked to conflicts at the workplace and problems in the organizational culture.

Occupational health practices development could involve a project in coordination with the workplace safety organization in order to sensitize physicians both on an organizational and individual level to notice, face, discuss, and help solve health problems affecting themselves or of colleagues. Story-telling or Balint groups could foster awareness of and reflection on problems related to workplace atmosphere, patient care, or one's own health.

Psychological testing before entering medical school could be considered for screening students suitable for the stressful medical profession or in need of therapeutic interventions. This could be repeated during the last year of medical school to help graduating physicians in choosing their future specialties. Courses in philosophy and psychology to enhance self-awareness and to maintain one's integrity, teamwork skills, education, and stress management should be considered obligatory for medical students, along with refresher courses for specialist physicians.

8.1.3 Personal interventions

“Anesthesiologists should affirm the healthy attitude that their personal lives as people should not be separable from their professional lives as practitioners” (Jackson 1999). They should accept that they are normal human beings with normal human needs, needs also for recreation and enjoyment. This can be facilitated and their well-being enhanced by strengthening self-care practices such as physical exercise, stretching, proper nutrition and hygiene, adequate sleep and rest, satisfying hobbies and diversions, and time with family and friends (Jackson 1999).

Appropriate therapy – including cognitive behavioral and relaxation techniques – should, when necessary, be organized for each individual with neither fear of job loss nor of breaching patient confidentiality. Physicians' therapies have been shown to be more successful than those of the general population (Wallace et al. 2009).

Successful organizational, professional, and personal interventions may dramatically enhance the health and well-being of anesthesiologists and reduce their stress levels, depression and intentions to commit suicide.

8.2 Recommendations for future studies

Fear of harming patients and combining work with family life should be studied more intensively as sources of stress among anaesthesiologists. More awareness is needed of associations between perceived stress, related symptoms, sick leave, and health issues. Perceived stress symptoms should be taken seriously as possible signs of a disturbance of homeostasis. Biological stress markers and autonomic nervous system function should be tested, as well as tissue oxygenation during on-call duty and after two weeks on vacation. The results of these tests will allow development of methods for early detection of work-related stress and for monitoring consequences of stress. Interventional studies are needed on a shorter on-call period (12 or 17 hours) and its effect on stress levels, symptoms, and markers.

Qualitative studies are necessary for profound understanding of the culturally structured mental and gender-specific models lying behind problems linked to organizational and medical culture, especially the mismatch in value systems between the physician and the organization/modern medicine. Using the themes that emerge in qualitative inquiry, an epidemiological investigation should be carried out to help understand the problems to their full extent.

Further research is needed on the gender-related total daily workload, related strain, and protective coping mechanisms that act as buffers against stress. In order to better understand and strengthen the existing coping resources among anesthesiologists, it would be wise to study their personality traits.

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- Heponiemi T., PhD, Docent of Psychology, Institute of Health and Wellfare, Helsinki, personal communication on the 15th of May, 2009. Subject: unpublished results of the Finnish Physician Study 2006, two email files.
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Appendix 1. The questionnaire

Anestesiaalääkärin työhön liittyvä hyvinvointi

- Täytä lomake huolellisesti ja pyri vastaamaan jokaiseen kysymykseen.
- Jos toimit anestesiaalääkärinä, vastaa nykyisen **päätyösi** mukaan. Mikäli et ole tällä hetkellä anestesiaalääkärin työssä, vastaa viimeisimmän anestesiaalääkärin työsi mukaan.
- Sinua pyydetään kysymysmuodosta riippuen **rengastamaan yhden** tai tarvittaessa **useamman** vaihtoehdon edessä oleva **numero** tai **kirjoittamaan numerovaihtoehto** kysymyksen jälkeiselle **viivalle**.
- Ole ystävällinen ja **palauta** lomake oheisessa kuoressa 4 vk:n kuluessa **15.4.2004** mennessä. Kiitos!!

TAUSTATIEDOT

1. Sukupuoli

- 1 mies
- 2 nainen

2. Minkä ikäinen olet?

____ -vuotias

3. Akateeminen koulutus

- 1 LL tai vastaava
- 2 LKT, LT

4. Muu akateeminen pätevyys (valitse 0,1 tai useampia)

- 1 dosentti
- 2 professori (myös todetut pätevyudet)
- 3 lisäksi muu akateeminen tutkinto

5. Kuinka kauan olet tehnyt kliinistä anestesiaalääkärin (erikoistuvan ja erikoislääkärin) työtä? ____ v

6. Oletko tällä hetkellä pääasiallisesti anestesiaalääkärin työssä?

- 1 kyllä (vastaa a-kohtaan)
- 2 en (vastaa b-kohtaan)

a) Olen

- 1 anestesiaalääkärinä kokopäivätyössä
- 2 anestesiaalääkärinä osapäivätyössä, (selitä halutessasi tarkemmin) _____

b) Olen

- 1 muuta kuin anestesiaalääkärin työtä tekevä
- 2 äitiys- tai isyyslomalla
- 3 hoitovapaalla
- 4 varhaiseläkkeellä
- 5 vanhuuseläkkeellä
- 6 työkyvyttömyyseläkkeellä
- 7 pitkällä sairauslomalla (>2kk)
- 8 tutkimusvapaalla
- 9 muuten poissa työelämästä

Vastaa seuraaviin kysymyksiin viimeisen anestesiaalääkärin työsi mukaan. Lisää viivalle ajankohta, jota vastaukset koskevat, mikäli se ei ole nykyhetki _____

7. Päätoimipaikka

- 1 yliopistollinen sairaala
- 2 muu keskussairaala
- 3 aluesairaala
- 4 muu sairaala
- 5 lääkärikeskus tai muu yksityinen vastaanotto
- 6 yliopisto, tutkimuslaitos
- 7 lääketeollisuus
- 8 muu

8. Mikä on nimikkeesi päätoimessasi?

- 1 johtava lääkäri, ylilääkäri, osaston-ylilääkäri, apulaisyli-lääkäri
- 2 osastonlääkäri, erikoislääkäri
- 3 erikoistuva tai sairaalalääkäri
- 4 yksityislääkäri
- 5 professori
- 6 apulaisopettaja, tutkija, assistentti
- 7 muu

9. Oletko päätyössäsi

- 1 työsuhteessa
- 2 yksityisenä ammatinharjoittajana / yrittäjänä

10. Onko päätyösi

- 1 vakituinen
- 2 määräaikainen
- 3 sijaisuus

11. Kuinka kauan olet ollut

- a) nykyisen työnantajasi palveluksessa (HUS: ssa myös edeltävät organisaatiot -HYKS, HEKS, USHP- mukaan luettuina) ____ v
- b) nykyisessä päätoimessasi? ____ v

12. Vastaa, mikäli et ole vakinaisessa työsuhteessa

- a) Arvioi, kuinka kauan olet työurasi aikana työskennellyt määräaikaissa työsuhteissa tai sijaisena yhteensä? ____ v
- b) Milloin nykyinen määräyskirjasi alkoi? ____v ____kk sitten
- c) Milloin nykyinen määräyskirjasi päättyi? ____v ____ kk päästä

13. Kuinka pitkä työviikkosi on keskimäärin nykyiselläään päätoimessasi (ilman päivystyksiä) ? ____ t**14. Paljonko sinulla kuluu viikossa aikaa**

- a) työmatkoihin ____ t
- b) työajan ulkopuolella tapahtuvaan palkattomaan ammattiin liittyvään opiskeluun/ työskentelyyn ____ t

15. Paljonko käytät viikossa yhteensä aikaa kaikkiin sivutoimiisi?

- 1 ei sivutoimia
- 2 sivutoimiseen yksityisvastaanottoon ____ t
- 3 muihin sivutoimiin ____ t

PSYKOSOSIAALISET TYÖOLOT**16. Tunnetko saavasi työstäsi tyydytystä?**

- 1 en koskaan
- 2 joskus
- 3 usein
- 4 aina

17. Kuinka tyytyväinen olet seuraaviin asioihin päätoimessasi?

Ympyröi sopiva numero skaalalla 1:stä 5:een, jossa

1 = olen erittäin tyytymätön, 5 = olen erittäin tyytyväinen

A. Perusturvan takaaminen

- a) työsuhteeni jatkuvuuteen 1 2 3 4 5
- b) palkkaani ja muihin työsuhte-etuihin 1 2 3 4 5

B. Arvostuksen ja oikeudenmukaisuuden kokeminen

- c) työstäni työtovereiltani saamaani kiitokseen 1 2 3 4 5
- d) työstäni työtovereiltani saamaan arvostuksen ja oikeudenmukaiseen kohteluun 1 2 3 4 5
- e) lähiesimieheltäni saamaani arvostukseen, tukeen ja oikeudenmukaiseen kohteluun 1 2 3 4 5
- f) johtavalta esimieheltäni saamaani arvostuksen ja oikeudenmukaiseen kohteluun 1 2 3 4 5
- g) työyksikköni (leikkaussali) johtamistapaan 1 2 3 4 5
- h) sairaalani johtamistapaan 1 2 3 4 5
- i) potilailta saamaani kiitokseen 1 2 3 4 5

C. Itsensä toteuttaminen

- j) urakehitykseeni 1 2 3 4 5
- k) mahdollisuuteen auttaa työssäni muita ihmisiä 1 2 3 4 5
- l) tunteeseen, että olen saavuttanut jotain merkittävää työssäni 1 2 3 4 5
- m) henkilökohtaiseen kasvuun ja kehitykseen työssäni 1 2 3 4 5

- n) mahdollisuuksiini ajatella ja toimia itsenäisesti työssäni 1 2 3 4 5
- o) työni haasteellisuuteen 1 2 3 4 5
- p) inhimillisten näkökohtien huomioon ottamiseen suunniteltaessa muutoksia työyksikössämme 1 2 3 4 5

18. Haluaisitko vaihtaa nykyisen lääkärintyösi muuhun lääkärintyöhön?

- 1 en
- 2 mahdollisesti
- 3 kyllä

19. Jos olisi mahdollista, vaihtaisitko lääkärin ammatin samantuloiseen toiseen ammattiin?

- 1 en
- 2 mahdollisesti
- 3 kyllä

20. Seuraavat väittämät käsittelevät työyhteisöäsi koskevaa päätöksentekoa organisaatiossa.

Ympyröi sopiva vaihtoehto skaalalla 1:stä 5:een, jossa 1=täysin eri mieltä, 5=täysin samaa mieltä.

- a) Päätökset tehdään oikean tiedon perusteella 1 2 3 4 5
- b) Epäonnistuneet päätökset voidaan muuttaa. 1 2 3 4 5
- c) Kaikilla on oikeus sanoa mielipiteensä itseään koskevissa asioissa 1 2 3 4 5
- d) Tehdyt päätökset ovat johdonmukaisia 1 2 3 4 5
- e) Päätöksen vaikutuksia seurataan ja niistä tiedotetaan 1 2 3 4 5
- f) Päätöksen perusteista saa halutessaan lisätietoa. 1 2 3 4 5

21. Kuinka paljon voit vaikuttaa seuraaviin asioihin päätyössäsä?

en jonkin melko paljon
lainkaan verran paljon

- a) työtäsi koskeviin muutoksiin 1 2 3 4
- b) siihen, mitä työtehtäviä kuuluu 1 2 3 4
- c) siihen, missä järjestyksessä teet työsi 1 2 3 4
- d) ajankäyttösi 1 2 3 4
- e) työtahtiisi 1 2 3 4
- f) työmenetelmiisi 1 2 3 4
- g) siihen, miten työt jaetaan ihmisten kesken 1 2 3 4
- h) siihen, keiden kanssa työskentelet 1 2 3 4
- i) laitehankintoihin 1 2 3 4

22. Kuinka paljon seuraavia seikkoja / asioita esiintyy koko työyksikössäsi päätoimessasi?

ei jonkun melko paljon
lainkaan verran paljon

- a) kilpailuhenkeä 1 2 3 4
- b) esimiesten ja alaisten välisiä ristiriitoja 1 2 3 4
- c) työntekijöiden välisiä ristiriitoja 1 2 3 4
- d) eri henkilöstöryhmien välisiä ristiriitoja 1 2 3 4

23. Työpaikkakiusaamisella tarkoitetaan työyhteisön jäsenen kohdistettua eristämistä, työn mitätöintiä, uhkaamista, selän takana puhumista, seksuaalista häirintää tai muuta painostusta.

23.a) Esiintyykö mielestäsi työpaikallasi työpaikkakiusaamista?

- 1 ei
2 joskus
3 jatkuvasti
9 en osaa sanoa

23.b) Oletko itse ollut tällaisen kiusaamisen kohteena?

- 1 en
2 kyllä, tällä hetkellä
3 kyllä, aiemmin tässä työpaikassa, en enää
4 kyllä, aiemmin toisessa työpaikassa

TYÖYMPÄRISTÖHAITAT

24. Onko fyysinen työympäristösi mielestäsi viihtyisä?

- 1 ei 2 kyllä 9 en osaa sanoa

25. Onko työsi a) ruumiillisesti b) henkisesti

- 1 kevyttä 1 kevyttä
2 melko kevyttä 2 melko kevyttä
3 melko rasittavaa 3 melko rasittavaa
4 rasittavaa 4 rasittavaa

26. Sisältyykö työhösi kumarassa tai selkä muuten hankalassa asennossa työskentelyä?

- 1 ei lainkaan
2 vain satunnaisesti
3 muutamana päivänä viikossa 1 - 4 tuntia
4 muutamana päivänä viikossa yli 4 tuntia
5 päivittäin alle tunti
6 päivittäin 1 - 4 tuntia

27. Millaisena koet seuraavat vaarat työssäsi?

| | en koe vaarana lainkaan | ajattelen silloin tällöin | koen vaarana |
|---|-------------------------------|---------------------------------|-----------------|
| a) tapaturmat | 1 | 2 | 3 |
| b) väkivallan kohteeksi joutuminen | 1 | 2 | 3 |
| c) anestesiakaasuista aiheutuvat | 1 | 2 | 3 |
| d) muista kemiallisista aineista aiheutuvat | 1 | 2 | 3 |
| e) säteily | 1 | 2 | 3 |
| f) suuronnettomuus | 1 | 2 | 3 |
| g) sairauksien tartunta | 1 | 2 | 3 |
| h) latex-allergia | 1 | 2 | 3 |
| i) homealtistus | 1 | 2 | 3 |
| j) muuhun käsi-ihottumaan sairastuminen | 1 | 2 | 3 |
| k) kulumasairaus/ rasitusvamma | 1 | 2 | 3 |
| l) syöpään sairastuminen | 1 | 2 | 3 |
| m) mielenterveyden järkkäminen | 1 | 2 | 3 |
| n) vakava työuupuminen | 1 | 2 | 3 |
| o) tapaturman aiheuttaminen toiselle työntekijälle | 1 | 2 | 3 |

| | | | |
|---|---|---|---|
| o) vahingon aiheuttaminen potilaalle | 1 | 2 | 3 |
| p) arvokkaan laitteen tai työtuloksen turmeleminen | 1 | 2 | 3 |
| q) muu, mikä _____ | 1 | 2 | 3 |

STRESSI JA BURN OUT

28. Oletko tällä hetkellä mielestäsi stressaantunut?

- 1 en
2 jossain määrin
3 selvästi

29. Mikä mielestäsi aiheuttaa sinulle

a) stressiä (ympyröi),

b) eniten stressiä (alleviivaa 1 kohta) ?

- 1 työ
2 perhe
3 työ- ja perheasioiden yhteensovittaminen
4 terveydentila
5 taloudellinen tilanne
6 läheiset ihmissuhteet (muu kuin perhe)
7 muu, mikä _____

30. Kuinka usein kukin alla mainittu asia on selvästi häirinyt, huolestuttanut tai rasittanut sinua viimeisen 6 kk:n aikana?

1. erittäin harvoin tai ei koskaan
2. melko harvoin,
3. silloin tällöin
4. melko usein
5. erittäin usein tai jatkuvasti

A. Kiire/ Työmäärä

| | | | | | |
|---|---|---|---|---|---|
| - liiallinen kokonaistyömäärä | 1 | 2 | 3 | 4 | 5 |
| - liian vähän aikaa työtehtävän tekemiseen kunnolla | 1 | 2 | 3 | 4 | 5 |
| - henkilöstön määrällinen riittämättömyys | 1 | 2 | 3 | 4 | 5 |
| - odottamattomat ruuhkat | 1 | 2 | 3 | 4 | 5 |
| - jatkuvat keskeytykset, työtehtäviä ei voi tehdä yhtäjaksoisesti alusta loppuun | 1 | 2 | 3 | 4 | 5 |

B. Ihmissuhteet työpaikalla

| | | | | | |
|--|---|---|---|---|---|
| - eri tahojen keskenään erilaiset ja ristiriitaiset odotukset työni suhteen | 1 | 2 | 3 | 4 | 5 |
| - työpaikan ihmissuhdeongelmat | 1 | 2 | 3 | 4 | 5 |
| - työkuormituksen epätasainen jakautuminen eri henkilöiden kesken | 1 | 2 | 3 | 4 | 5 |
| - työyhteisön joustavuuden puute | 1 | 2 | 3 | 4 | 5 |

C. Työn sisältö

| | | | | | |
|---|---|---|---|---|---|
| - toisarvoiset työt vievät aikaa "varsinaiselta" tärkeimmältä työltäni | 1 | 2 | 3 | 4 | 5 |
| - työn yksitoikkoisuus | 1 | 2 | 3 | 4 | 5 |
| - työn tai toimenpiteen vaikeus | 1 | 2 | 3 | 4 | 5 |
| - jatkuvasti muuttuva tehtäväkenttä | 1 | 2 | 3 | 4 | 5 |
| - liian laaja tehtäväkenttä | 1 | 2 | 3 | 4 | 5 |
| - liian suppea tehtäväkenttä | 1 | 2 | 3 | 4 | 5 |

D. Ammatillisen itsemäärämisoikeuden puute

| | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

E. Työn ja perhe-elämän/

| | | | | | |
|--|---|---|---|---|---|
| <u>vapaa-ajan yhteensovittamisen vaikeus</u> | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

F. Levon puute

| | | | | | |
|---|---|---|---|---|---|
| - riittävän levon puute liian suuren työsidonnaisuuden vuoksi | 1 | 2 | 3 | 4 | 5 |
| - liian aikainen työn aloitus | 1 | 2 | 3 | 4 | 5 |
| - odottamattomat ylityöt | 1 | 2 | 3 | 4 | 5 |
| - päivystäminen | 1 | 2 | 3 | 4 | 5 |

G. Vastuu

| | | | | | |
|---|---|---|---|---|---|
| - vastuun kanto | 1 | 2 | 3 | 4 | 5 |
| - konsultaatiomahdollisuuksien puute | 1 | 2 | 3 | 4 | 5 |
| - jatkuva valmius kriisitilanteen hoitoon | 1 | 2 | 3 | 4 | 5 |
| - potilaiden odotukset työni suhteen | 1 | 2 | 3 | 4 | 5 |
| - syytteen pelko | 1 | 2 | 3 | 4 | 5 |

31. Koetko voitvasi vaikuttaa työhösi liittyvän stressin hallintaan?

1 en lainkaan 2 hieman 3 melko paljon 4 paljon

32. Minkälaisin toimenpitein voitaisiin stressiä anestesialääkärin työssä mielestäsi parhaiten lieventää? Ympyröi 4 tärkeintä vaihtoehtoa.

- työn bio-kemiallis-fysikaalisia haittoja minimoimalla
- ergonomisia haittoja vähentämällä
- päivystysrasitusta pienentämällä
- joustavilla työaikajärjestelyillä
- ammattiliasta koulutusta kehittämällä
- stressinhallintakoulutuksella
- kuntoutuksella
- osa-aikatyöllä tai -eläkkeellä
- kehittämällä johtamista
- tarkoitusemukaisilla tehtäväjärjestelyillä ottamalla yksilölliset tarpeet ja kyvyt huomioon
- antamalla lisää positiivista palautetta
- lisäämällä vaikutusmahdollisuuksia
- vakinaistamalla sijaisuudet
- työpaikkaliikunnalla ja taukojumpalla
- palkkaamalla lisää henkilökuntaa
- muunlaisin toimenpitein, miten _____

33. Kuinka usein seuraavat väittämät koskevat itseäsi?

Mashlachin burn out –mittari. Vastaa jokaiseen kohtaan.

| | |
|-------------------------------|----------------------------|
| 1 ei koskaan | 5 kerran viikossa |
| 2 muutaman kerran vuodessa | 6 muutaman kerran viikossa |
| 3 kerran kuukaudessa | 7 joka päivä |
| 4 muutaman kerran kuukaudessa | |

- Tunnen olevani henkisesti tyhjiin puserrettu työstäni. _____
- Työpäivän päättyessä tunnen olevani aivan lopussa. _____
- Olen väsynyt jo aamulla tietäessäni, että minun pitää kohdata uusi työpäivä. _____
- Minun on helppo ymmärtää, miltä potilaistani/asiakkaistani tuntuu. _____
- Tunnen kohtelevani joitakin potilaita/asiakkaita ikäänkuin he olisivat esineitä. _____
- Jatkuva työskentely ihmisten parissa on minulle todella rasittavaa. _____
- Käsittelem potilaitteni/asiakkaitteni ongelmia erittäin hyvin tuloksin. _____
- Tunnen olevani lopen uupunut työstäni. _____
- Tunnen vaikuttavani myönteisesti ihmisten elämään työni kautta. _____

- Olen tunteettomampi ihmisiä kohtaan kuin mitä olen aloittaessani tämän työn. _____
- Olen huolissani, että tämä työ kovettaa minua. _____
- Tunnen olevani täynnä energiaa. _____
- Työni turhauttaa minua. _____
- Tunnen tekeväni liikaa työtä. _____
- En oikeastaan välitä siitä, miten joidenkin potilaiden/asiakkaiden käy. _____
- Työskentely välittömästi ihmisten kanssa stressaa minua työssäni liikaa. _____
- Pystyn helposti luomaan leppoisan ilmapiirin potilaitteni/asiakkaitteni kanssa. _____
- Tunnen itseni iloiseksi työskenneltyäni kiinteästi potilaitteni/asiakkaitteni kanssa. _____
- Olen saanut aikaan monia arvokkaita asioita tässä työssä. _____
- Tunnen olevani kestäväni rajoilla. _____
- Pystyn suhtautumaan tyyneesti henkisiin ongelmiin työssäni. _____
- Tunnen, että potilaat/asiakkaat syyttävät minua joistakin ongelmistaan. _____

34. Jos olet ollut kohtuuttoman uupunut, mitä olet tehnyt?

- en ole ollut kohtuuttoman uupunut
- en mitään, odotellut tilanteen paranemista
- käyttänyt lääkitystä
- nauttinut alkoholia
- tupakoinut / nuuskannut runsaasti
- keskittynyt harrastuksiin, liikuntaan tms.
- keskustellut asiasta perheenjäseneni ja ystäväni kanssa
- ottanut lomaa
- tehnyt muutoksia työjärjestelyihini
- tehnyt aloitteita työnantajalle
- hakenut ammattiapua
- ollut sairauslomalla
- muuta, mitä _____

PÄIVYSTYKSET JA VOINTI**35. Kuinka kauan olet anestesiarasi (erikoistuminen mukaan laskettuna) aikana osallistunut päivystyksiin? ___ v****36.–39. Päivystyksen määrä**

Vastaa mahdollisimman tarkasti.

36. Osallistutko päivystykseen nykyisessä päätyössäsi?

- en, siiry kysymykseen 40
- kyllä

37. Päivystätkö etupäivystystä (sairaala-/ aktiivipäivystys)?

- en, siiry kohtaan 38
- kyllä
 - Etupäivystän keskimäärin _____ vrk/kk.
 - Kokonaistuntimääräni on _____ t/ arkipäivän päivystysrupeama, josta
 - päivystystunteja on _____ t
 - Etupäivystyksistäni on aktiivitunteja keskimäärin _____ %.

38. Osallistutko vapaamuotoiseen päivystykseen (taka- tai kotipäivystys)?

1 en, siirry kohtaan 39

2 kyllä

a) keskimäärin ___ vrk/kk, josta keskimäärin

b) aktiivitunteja ___ t/päivystys.

39. Minulla on yhteensä (37.+38.)

a) päivystystunteja ___ vrk/kk.

b) yötyötunteja (22-06) ___ t/kk, joista

c) aktiivitunteja ___ t/kk.

40. Päivystys ja oireilu.

Esiintykö sinulla yleensä seuraavia oireita?

| | Päivystäessäsi tai sitä seuraavana päivänä | | Kun olet ollut 2 vk lomalla | |
|------------------------------|--|-------|-----------------------------|-------|
| | ei | kyllä | ei | kyllä |
| A. Somaattiset oireet | | | | |
| päänsärkyä | 1 | 2 | 1 | 2 |
| pahoinvointia | 1 | 2 | 1 | 2 |
| närästystä | 1 | 2 | 1 | 2 |
| vatsakipuja | 1 | 2 | 1 | 2 |
| turvotuksia | 1 | 2 | 1 | 2 |
| nenän tukkoisuutta | 1 | 2 | 1 | 2 |
| kyynelvuotoa | 1 | 2 | 1 | 2 |
| ihottuma | 1 | 2 | 1 | 2 |
| haukottelua | 1 | 2 | 1 | 2 |
| palelua | 1 | 2 | 1 | 2 |
| voimakasta hikoilua | 1 | 2 | 1 | 2 |
| huimausta | 1 | 2 | 1 | 2 |
| vapinaa | 1 | 2 | 1 | 2 |
| rytmihäiriöitä | 1 | 2 | 1 | 2 |
| rintakipua | 1 | 2 | 1 | 2 |
| muuta kipuja | 1 | 2 | 1 | 2 |
| infektioherkkyyttä | 1 | 2 | 1 | 2 |
| unirytmien häiriöitä | 1 | 2 | 1 | 2 |

B. Psykkiset oireet

| | | | | |
|--|---|---|---|---|
| väsymystä tai uupumusta | 1 | 2 | 1 | 2 |
| ärtyneisyyttä tai vihaisuutta | 1 | 2 | 1 | 2 |
| epävarmuutta, ahdistuneisuutta, pelkotiloja | 1 | 2 | 1 | 2 |
| itkuisuutta, alavireisyyttä tai masentuneisuutta | 1 | 2 | 1 | 2 |
| syyllisyyttä siitä, että et kykene hoitamaan | | | | |
| velvollisuksiasi haluamallasi tavalla | 1 | 2 | 1 | 2 |
| painajaisia | 1 | 2 | 1 | 2 |
| itsetuhoisia ajatuksia tai toimintaa | 1 | 2 | 1 | 2 |

C. Kognitiiviset häiriöt

| | | | | |
|---|---|---|---|---|
| koordinaatiohäiriöitä | 1 | 2 | 1 | 2 |
| muistihäiriöitä | 1 | 2 | 1 | 2 |
| orientaatiohäiriöitä | 1 | 2 | 1 | 2 |
| nukahtelutaipumusta kesken aktiviteetin (autolla ajo) | 1 | 2 | 1 | 2 |
| vaikeuksia puhua sujuvasti | 1 | 2 | 1 | 2 |
| vaikeuksia ymmärtää puhetta | 1 | 2 | 1 | 2 |
| muuta ajatustoiminnan häiriöitä, mitä _____ | 1 | 2 | 1 | 2 |

D. Käytöshäiriöt

| | | | | |
|--|---|---|---|---|
| ylensyöntiä, bulimiamia | 1 | 2 | 1 | 2 |
| tarvetta rentoutua alkoholin avulla | 1 | 2 | 1 | 2 |
| tarvetta nukkua/ rentoutua uni-/ rauhoittavien lääkkeiden avulla | 1 | 2 | 1 | 2 |
| muuta ____, mitä _____ | 1 | 2 | 1 | 2 |

41. Jos päivystys rasittaa sinua, mitkä olisivat mielestäsi tärkeimmät muutokset, jotka helpottaisivat päivystysrasitusta juuri sinun kohdallasi?

ELÄMÄNLAATU, TYÖKYKY JA TERVEYDENTILA

42. Kuinka tyytyväinen olet yleensä elämääsi?

- 1 hyvin tyytyväinen
- 2 kohtalaisen tyytyväinen
- 3 melko tyytymätön
- 4 hyvin tyytymätön

43. Millaiseksi arvioit elämänlaatusi viimeisen 4 viikon aikana VAS-asteikolla? Huonoin mahdollinen elämänlaatu 0, parasta mahdollinen 100.

0 _____ 100

44. Millaiseksi arvioit ikäisesi ja samaa sukupuolta olevan keskivertosuomalaisen elämänlaadun?

0 _____ 100

45. Minkä pistemäärän antaisit nykyiselle työkyvyillesi asteikolla, jonka mukaan paras mahdollinen työkyky olisi 10 ja täysin työkyvytön saisi pistemäärän 0?

1 2 3 4 5 6 7 8 9 10

46. Onko oma terveydentilasi nykyisin mielestäsi?

- 1 huono
- 2 melko huono
- 3 keskitasoinen
- 4 melko hyvä
- 5 hyvä

47. a) Paljonko painat? _____ kg b) Kuinka pitkä olet? _____ cm

48. Onko sinulla esiintynyt seuraavia sairauksia/oireita kuluneen 12 kk:n aikana? Jos on, kuinka olet niitä hoitanut?

| | ei | kyllä, hoitanut itse | kyllä, ollut toisen lääkärin hoidossa |
|---------------------------|----|----------------------|---------------------------------------|
| a) verenpainetauti | 1 | 2 | 3 |
| c) sydämen vajaatoiminta | 1 | 2 | 3 |
| d) sokeritauti | 1 | 2 | 3 |
| e) mielen terveydenhäiriö | 1 | 2 | 3 |
| f) migreeni | 1 | 2 | 3 |
| g) allerginen nuha | 1 | 2 | 3 |
| h) astma | 1 | 2 | 3 |

- | | | | |
|--|---|---|---|
| i) krooninen bronkiitti, keuhkolaajentuma | 1 | 2 | 3 |
| j) ruoansulatuselimistön sairaus | 1 | 2 | 3 |
| k) kuukautiskierron häiriö | 1 | 2 | 3 |
| l) raskauteen liittyvä häiriö | 1 | 2 | 3 |
| m) latex-allergia | 1 | 2 | 3 |
| n) selkäsairaus | 1 | 2 | 3 |
| o) syöpä, mikä _____ | 1 | 2 | 3 |
| p) krooninen kiputila, mikä _____ | 1 | 2 | 3 |
| q) krooninen väsymysoireyhtymä | 1 | 2 | 3 |
| r) burn out | 1 | 2 | 3 |
| s) muu pitkäaikainen sairaus, mikä _____ | 1 | 2 | 3 |

- j) ulkoisesta häiriötekijästä (melu, huono sänky, huono huoneilma)
k) vapaa-ajan harrastuksista
l) muusta syystä, mistä _____

53. Kuinka paljon terveydentilanteesi ja/tai sairautesi on viimeisen vuoden aikana häitannut?

| | | | | | |
|------------------|----------------|--------|--------------------|-----------------|--------------------|
| | ei lainkaan | hieman | kohta- laisesti | melko paljon | erittäin paljon |
| a) ”kotikykyäsi” | 1 | 2 | 3 | 4 | 5 |
| b) työkykyäsi | 1 | 2 | 3 | 4 | 5 |

49. Kuinka usein jokin seuraavista oireista on vaivannut sinua viimeksi kuluneen 12 kk aikana?

| | harvoin tai ei koskaan | silloin tällöin | aika usein | usein tai jatkuvasti |
|--|------------------------------|--------------------|---------------|-------------------------|
| a) ruoansulatuskanavan oireet | 1 | 2 | 3 | 4 |
| b) niskahartianseudun kivut | 1 | 2 | 3 | 4 |
| c) lanne-ristiselän säröt | 1 | 2 | 3 | 4 |
| d) muskuloituneisuus päänsärky | 1 | 2 | 3 | 4 |
| e) migreeni | 1 | 2 | 3 | 4 |
| f) huimaus | 1 | 2 | 3 | 4 |
| g) takykardia tai epäsäännöllinen sydämen toiminta | 1 | 2 | 3 | 4 |
| h) rintakipu | 1 | 2 | 3 | 4 |
| i) liiallinen hikoilu ilman fyysistä ponnistelua | 1 | 2 | 3 | 4 |
| j) dyspnea ilman fyysistä ponnistelua | 1 | 2 | 3 | 4 |
| k) unirytmien häiriöt | 1 | 2 | 3 | 4 |
| l) heräämisvaikeudet tai päiväaikainen väsymys | 1 | 2 | 3 | 4 |
| m) painajaiset | 1 | 2 | 3 | 4 |
| n) energian puute, heikkous | 1 | 2 | 3 | 4 |
| o) depressio | 1 | 2 | 3 | 4 |
| p) seksuaalinen haluttomuus | 1 | 2 | 3 | 4 |
| q) ahdistuneisuus, ärtyvyys | 1 | 2 | 3 | 4 |
| r) muu, mikä _____ | 1 | 2 | 3 | 4 |

50. Kuinka paljon nuket keskimäärin vuorokaudessa päiväunet mukaan laskettuna ½ t tarkkuudella? ____t

51. Koetko unen ja levon määrän yleensä olevan sinulle riittävän?

1 en 2 kyllä, siirry kysymykseen 53

52. Mistä arvioit unen riittämättömyyden johtuvan?

- työn määrästä
- ajan puutteesta
- unihäiriöstä
- huonosta terveydestä
- päivystyksestä
- muista työhön liittyvistä tekijöistä
- muuhun elämään liittyvistä stressitekijöistä
- myöhäisestä nukkumaanmenoajasta
- alkoholin nauttimisesta

Jos olet mies, siirry kysymykseen 56.

54. Vaikuttaako a) kuukautiskierto tai b) vaihdevuodet voittaisi työssäsi?

a) 1 ei 2 kyllä, miten? _____

b) 1 ei 2 kyllä, miten? _____

55. Seuraava kysymys on kohdistettu vain niille, jotka ovat/ ovat olleet raskaana toimiessaan anestesia- ja lääkärintoimissa. Onko raskaus vaikuttanut työhön liittyvään hyvinvointiisi (jaksaminen, raskauden sujuminen, teratogeenisten aineiden kanssa työskentely, infektiovaara)?

1 ei 2 kyllä, miten?

56. Montako kertaa viimeksi kuluneen 12 kk aikana olet käynyt potilaana

a) työterveyslääkärin vastaanotolla? ____ krt

b) muun lääkärin vastaanotolla? ____ krt

c) muussa kuin lääkärin hoidossa (esim kiropraktikolla, fysioterapeutilla, psykologilla) vaivojesi johdosta? ____ krt

57. a) Teetkö töitä sairaana?

1 en koskaan 2 harvoin 3 joskus 4 usein

b) Jos teet sairaana töitä, niin miksi teet niin?

n

58. Oletko viimeksi kuluneen vuoden aikana ollut sairauslomalla (myös ilman lääkärintodistusta)?

1 en

2 sairauslomalla/-lomilla yhteensä ____ vrk, diagnoosit _____

59. Suomalaisista lääkäreistä lähes joka neljännellä on ajoittain itsemurha-ajatuksia. Oletko sinä joskus vakavasti miettinyt tai suunnitellut itsemurhaa?

- 1 en koskaan
- 2 olen ajatellut
- 3 olen vakavasti suunnitellut
- 4 olen yrittänyt

TERVEYSKÄYTTÄYTYMINEN

60. a) Kuinka monta viikkoa A) vuosilomaa, B) aktiivivapaata olet pitänyt viimeisen 12 kk aikana?

A) ___ viikkoa, B) ___ viikkoa

60. b) Kuinka suuren osan vapaastasi (A+B) vietit täysin erossa työstäsi rentoutuen perheen / ystävien / harrastusten parissa?

- 1 en lainkaan
- 2 alle puolet
- 3 suurimman osan

61. Mainitse kolme tärkeintä harrastustasi

1. _____
2. _____
3. _____

62. Kuinka usein harrastat vapaa-ajan liikuntaa vähintään 10 minuutin jaksoissa vähintään puoli tuntia päivässä yhteensä niin, että ainakin lievästi hengästyit ja hikoilet?

- 1 muutaman kerran vuodessa tai harvemmin
- 2 1-3 kertaa kuukaudessa
- 3 1-3 kertaa viikossa
- 4 4 kertaa tai useammin viikossa

63. Montako kofeiinipitoista kahvikupillista (kkp=n.1.5dl) kahvia juot vuorokaudessa?

- 1 en yhtään
- 2 1-3 kkp
- 3 4-6 kkp
- 4 \geq 6 kkp

64. a) Tupakoitko (savuke, sikari, piippu)

- 1 en
- 2 kyllä
- 3 satunnaisesti

64. b) Nuuskaatko

- 1 en
- 2 kyllä
- 3 satunnaisesti

65. a) Kuinka usein keskimäärin nautit alkoholia?

- 1 en koskaan
- 2 korkeintaan muutaman kerran vuodessa
- 3 1-3 kertaa kuukaudessa
- 4 kerran viikossa
- 5 2 päivänä viikossa
- 6 3 - 6 päivänä viikossa
- 7 päivittäin

65. b) Kuinka monta ravintola-annosta olet yleensä ottanut päivinä, jolloin olet käyttänyt alkoholia?

- 1 alle 1 annoksen
- 2 1-2 annosta
- 3 3-4 annosta
- 4 5-6 annosta
- 5 7-9 annosta
- 6 10 annosta tai enemmän

65. c) Oletko ollut alkoholinkäytön yhteydessä humalassa viimeksi kuluneen vuoden aikana?

- 1 en kertaakaan
- 2 kerran
- 3 2-3 kertaa
- 4 4-6 kertaa
- 5 7-12 kertaa
- 6 13 kertaa tai enemmän

65. d) Kuinka usein sinulla on ollut krapula viimeksi kuluneen vuoden aikana?

- 1 ei kertaakaan
- 2 1-2 kertaa
- 3 3-5 kertaa
- 4 6 kertaa tai enemmän

66. Käytätkö tällä hetkellä luonnonlääkkeitä, rohdoksia, vitamiineja tai hivenaineita?

- 1 en
- 2 kyllä

67. a) Käytätkö tällä hetkellä jotakin itsellesi määräämää lääkettä?

- 1 en
- 2 kyllä

67. b) Käytätkö seuraavia lääkkeitä?

1 en koskaan 2 satunnaisesti 3 melko usein 4 jatkuvasti

- | | | | | |
|---|---|---|---|---|
| a) bentsodiatsepiineja tai muita rauhoittavia | 1 | 2 | 3 | 4 |
| b) psykostimulantteja | 1 | 2 | 3 | 4 |
| c) antidepressantteja | 1 | 2 | 3 | 4 |
| d) opiaatteja | 1 | 2 | 3 | 4 |
| e) muita särkylääkkeitä | 1 | 2 | 3 | 4 |

67. c) Käytätkö muita kuin edellä mainittuja lääkkeitä säännöllisesti tai usein esim. perustautiisi?

- 1 en käytä
- 2 käytän

68. Kuinka monta anestesia-lääkäreitä tunnet, joilla on mielestäsi

- a) alkoholi-____, b) lääkkeiden väärinkäyttö- _____
c) huumeongelma ____?

PERHESUHTEET JA PSYKO-SOSIAALINEN TUKI

69. Oletko

- 1 naimisissa, avoliitossa tai rekisteröidyssä parisuhteessa
- 2 naimaton
- 3 asumuserossa tai eronnut
- 4 leski

70. Lapset ja/tai huollettavat

- 1 ei lapsia eikä muita huollettavia
- 2 yksi tai useampi alle kouluikäinen
- 3 yksi tai useampi kouluikäinen
- 4 yksi tai useampi aikuinen huollettava
- 5 ns. uusperhe
- 6 aikuisia lapsia

71. a) Kuinka monta tuntia päivässä sinulla kuluu kotitöihin ja huollettavien hoitoon? ___t**71. b) Tarvitsisitko säännöllistä kotiapua?**

- 1 en 2 kyllä, **kuinka monta t/vrk?** ___t

72. Jos ajattelet elämäsi taaksepäin, oletko tehnyt tietoisia kompromisseja joko työn tai perheen hyväksi tilanteessa, jossa näiden yhteensovittaminen on tuntunut vaikealta?

| Oletko | en | kyllä |
|--|----|-------|
| a) rajoittanut haluamaasi lasten lukumäärää työhön liittyvistä syistä? | 1 | 2 |
| b) lykännyt lasten hankkimista työhösi liittyvistä syistä? | 1 | 2 |
| c) työskennellyt vain osaaikaisesti perheen vuoksi? | 1 | 2 |

73. Ovatko koti- ja perheasiiasi mielestäsi

- 1 täysin kunnossa
- 2 jokseenkin kunnossa
- 3 jossakin määrin huolestuttavat
- 4 huolestuttavat

74. Onko sinulle, perheessäsi tai lähimpiesi piirissä tapahtunut, viimeisen 5 vuoden aikana sellaisia huomattavia muutoksia, jotka vaikuttavat vielä eläämääsi?

- 1 ei 2 kyllä, **mikä seuraavista?**

- a) kuolema, b) avo/avioero, c) vakava sairaus tai d) muu kriisi** (oikeusprosessi, asuntoon liittyvät ongelmat , jne)

75. Kuinka monta läheistä ystävää sinulla on?

noin _____ henkilöä

76. Onko sinulla joku, ...

1 ei koskaan 2 harvoin 3 joskus 4 useimmiten 5 jatkuvasti

- | | | | | | |
|---|---|---|---|---|---|
| a) jolta saat apua ollessasi vuoteen omana | 1 | 2 | 3 | 4 | 5 |
| b) joka antaa hyviä neuvoja kriisitilanteessa | 1 | 2 | 3 | 4 | 5 |
| c) joka tarvittaessa vie sinut lääkäriin | 1 | 2 | 3 | 4 | 5 |
| d) jolle voit uskoutua ja kertoa itsestäsi ja ongelmistasi | 1 | 2 | 3 | 4 | 5 |
| e) joka osoittaa sinulle hellyyttä | 1 | 2 | 3 | 4 | 5 |
| f) jonka kanssa voit viettää aikaa ja rentoutua | 1 | 2 | 3 | 4 | 5 |
| g) jota rakastat ja joka saa sinut tuntemaan itsesi tarpeelliseksi | 1 | 2 | 3 | 4 | 5 |
| h) jonka kanssa voit tyydyttää seksuaalisuuden tarpeitasi | 1 | 2 | 3 | 4 | 5 |
| i) joka auttaa sinua päivittäisissä askareissa, kun et itse selviä niistä | 1 | 2 | 3 | 4 | 5 |

ELÄKEIKÄ**77. Pitäisikö päivystysrasitus ja –aika ottaa huomioon eläkeikää määritettäessä?**

- 1 ei 2 kyllä

78. Minkä ikäisenä arvioit sinulle olevan tarpeellista terveytesi ja työkykyysi vuoksi päästä eläkkeelle anestesia lääkärintyöstäsi? _____-vuotiaana

Kommenteja: _____

PALJON KIITOKSIA VAIVANNÄÖSTÄSI!

Appendix 2. Scenes from the on-call life of an anesthesiologist

The picture of on-call work among anesthesiologists in Finland varies greatly. In a district hospital he/she might be very work-bound with 20 home calls a month, but having only 4 hours of on-call work at the hospital and not necessarily always night work. In a central hospital, an anesthesiologist may be responsible for the operating room, intensive care unit, emergency, and departments, thus being expected to be in many places at the same time:

A surgical team was waiting for me to anesthetize a patient with a rupturing aneurysm in the abdominal aorta. The internist wanted me to sedate a patient with a heart rate of 180 for cardiac version. And – a nurse from the emergency room was calling for help at the same time for an alcoholic who had fallen on broken beer bottles and been sutured after having wounds in his chest, because he was tachycardic, hypokalemic, vomiting blood, and vigorously tearing apart the venous and arterial lines, showing signs of delirium tremens. I could feel the irritation of my waiting counterparts as if I had been lazy while working elsewhere.

The anesthesiologist is often the first one to take the responsibility for saving the life of a critically ill unconscious patient driven to emergency. There he/she needs all his/her medical competence and life experience while trying to figure what has happened and what should be done and – quickly. Unpredictability and pressure to act correctly and fast may even be worse when working in an ambulance.

In a university hospital, the anesthesiologist has the possibility to consult not only an internist or a surgeon, but also another anesthesiologist. However, he/she may be too afraid to disturb the colleague or show incompetence.

APPENDIX

When working in a district hospital I felt very alone while struggling to save two lives: a 600-gram premature baby was born after the rupture of the placenta.

Once when on call at the emergency room, after having worked from 7.30 a.m. until 4 a.m. without a break, I had to fly to Denmark to take care of a brain dead patient during organ detachment for transplantation. My “workday” lasted 36 hours in unfamiliar and uncomfortable places without sleep, instead of the maximum 25 hours I had anticipated.

The anesthesiologist is quite often challenged in the middle of the night with problems:

A young colleague wanted me to resuscitate an incurably ill patient with a burned-out cirrhotic liver, COPD, diabetes mellitus, and cardiac failure. I had to argue and convince the internist, surgeon, and the relatives of my hard decision not to resuscitate, but to alleviate the suffering. Next morning I was unable to fall asleep while wondering whether the decision made was correct.