# Stress and burnout in anaesthesia

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**Current Opinion in Anaesthesiology** 2008, 21:406–411

**Purpose of review**

Recently, many researchers have been studying stress and burnout in anaesthesia. Some researchers have examined the effects of stress in the workplace. Others have identified some job characteristics that have an impact on anaesthetist's well-being. Yet, few studies use the same measure of stress and/or define the concept of stress in the same way, making comparison and aggregation of results difficult, and therefore minimizing the general impact of these research findings.

**Recent findings**

The following review focuses on the increasing recent research on stress and burnout in anaesthesia regarding the existing stress models and shows where the progress has been made, and where difference of opinion and divergence of approach remain.

**Summary**

From the referred studies, the review challenges the more practical problems of prevention of stress and burnout and provides some avenues for future investigations.

**Keywords**

anaesthesia, burnout, stress

Curr Opin Anaesthesiol 21:406–411

0952-7907

## Introduction

During the past 10 years, many researchers have been studying stress in anaesthesia. Some researchers have examined the effects of stress in the workplace and showed that anaesthesia is a stressful occupation, and that burnout is by no means rare among anaesthetists. Others have identified some job characteristics that have an impact on anaesthetist's well-being. Yet, few studies use the same measure of stress and/or define the concept of stress in the same way, making comparison and aggregation of results difficult, and therefore minimizing the general impact of these research findings. This conceptual confusion around the concepts of 'stress', 'stressor', 'strain', and 'mental health' is probably derived from the diversity of models of stress in the literature.

The goal of this study is to review recent research on stress in anaesthesia and to show where the progress has been made, and where difference of opinion and divergence of approach remain. Our primary aim is to discuss some of the conceptual and methodological issues. We would also like to address the more practical problems of prevention and management of stress within the context of anaesthesia.

A review of stress literature is always confronted by the problem of selecting the definition of 'stress'. As the definition adopted may have profound implications on measurement methodology, results interpretation and stress-reduction strategies, it must be clearly stated.

In this study, we chose to use the conceptual framework proposed by Mackay and Cooper [1] to categorize and discuss the past studies on stress in anaesthesia literature. From this perspective, the term 'stress' has been used in four different ways: as a stimulus, a response, a perception and finally as a transaction.

### Stress as a stimulus

Many studies on anaesthesia viewed stress as caused by job demand – a characteristic of the work environment that causes stress. Stress can be caused by a sudden encounter with a traumatic event (death of a patient) or more often by an exposure to chronic and adverse work conditions. In the literature, we found a real consensus on the job characteristics that may cause stress although the referred studies used different stress assessment methods (questionnaires and interviews), different statistical tests to show the relationship (correlation and regression analysis) and were conducted in different countries (e.g. Sweden, Austria, Belgium, Finland, Portugal, France, etc.). The six main consensual factors are

(1) time constraints,
(2) excessive (physical and mental) workload,

(3) complexity of the task,
(4) responsibility (ethical decision) and fear of harming patients,
(5) collective dimension of the job, workplace atmosphere, and communication issues,
(6) lack of job control,
(7) combining family with being on call.

In Sweden, Larsson *et al.* [2] conducted interviews on young and inexperienced trainee anaesthetists and found that the essence of their difficulties was the feeling of deep insufficiency and loneliness caused by very high work demands. Five themes were identified: a difficult role to play, a feeling of insufficiency, a lack of support, a feeling of loneliness, and helplessness. In Portugal [3], anaesthetists answering open questions on stress indicated the following issues as major stress factors: professional relationships, unskilled leadership, work overload, surgeons, poor working conditions, and technically difficult situations.

Almost the same working conditions are reported by anaesthetists at risk for burnout in Austria [4]: complexity of work, variability of work, influence of handling task, time control, communication, cooperation, time pressure, and work interruption.

An important comment is that the identification of the reported stress and burnout factors may have been more or less subject to some biases: response bias (influence of personality/trait effect on the measure), possible misattribution of symptoms to a presumed cause (especially in retrospective studies) and reverse or bi-directional causation. Recent studies conducted on work domains other than anaesthesia have used techniques such as Linear Structural Equation in Modelling (LISREL) the stress process, but methodological problems such as over-reliance upon subjective data still exist.

### Stress as a response

Stress has been perceived as a body of physiological, behavioural and psychological responses to some external or internal demands. Physiological mechanisms implicated in stress include autonomic nervous system and neuroendocrine mediators that influence immune, gastrointestinal, neuromuscular and cardiovascular system besides others. Acute activation of these systems is known to precipitate short-term adaptive responses whereas this adaptation is limited to psychomotor responses; high-level cognitive capabilities tend to be undermined rather than augmented by stress. Although short-term activation has short-term benefits, chronic activation of these systems enhances the vulnerability to stress diseases on a longer term. The hypothalamic–pituitary–adrenal (HPA) axis and subsequent cortisol secretion has been found to respond in acute stress situation, and there is strong evidence that frequent activation of the HPA axis could lead to a metabolic syndrome of illness such as 'burnout'. The most influential definition of burnout has been offered by Maslach and Jackson [5], who defined burnout as a syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment. Burnout represents a chronic ongoing reaction to one's work and a negative affective response to prolonged impairing stress which is not immediately reversible after changes in tasks or the working conditions. This conceptualization of burnout makes it distinct from a temporary state of stress like fatigue, which is reversible by adequate recuperation, or monotony, which disappears with a change in task activities [6]. Although short-term effects of stress develop as an immediate reaction to specific working conditions, burnout will develop only after repeated, prolonged and unsuccessful confrontation with such conditions (e.g. after 2 years of working experience at a specific job, according to Cherniss [7]). Thus, employees who are burnout by their work are characterized by the combination of an enduring physical, cognitive, and emotional deterioration of health, negative attitude (cynicism) and reduced professional efficacy.

Few studies have examined the objective of metabolic trace of stress in anaesthetists. For example, Malmberg *et al.* [8] compared the physiological restitution after night-call duty in anaesthesiologists ($n = 19$) with that in paediatric surgeons ($n = 18$) using an analysis of thyroid-stimulating hormone (TSH) and found that the TSH was significantly different on different days in both groups, with a 26% fall in level in the day after on-call duty and a 48% cortisol rise in the morning preceding night duty for the paediatric surgeons. This effect is probably a result of a stress-induced inhibition on the hypothalamic level. The authors did not found a clear-cut effect on cortisol. Yamakage *et al.* [9] measured salivary amylase concentrations on 12 Japanese medical trainees in anaesthesia to determine whether the individual stress changes within 1 day, and whether the stress reaction changes with the type of surgery (neck/face or abdominal surgery). They found that amylase concentration differed greatly depending on the lifestyle (night or day persons) and increased in the neck/face surgery.

Most studies have used self-reporting questionnaires to collect data based on stress-related symptoms. The most frequent stress symptoms that have been reported by anaesthetists [10–12] are irritation, sleep disturbances, nausea, memory and attention disturbance, anxiety, nightmares, self destructiveness, bulimia, need for sleeping medication or for alcohol, and so on. Burnout symptoms such as depersonalization, emotional exhaustion, low level of accomplishment and depressive problems are often included within the reported symptom list. Suicidal thoughts were associated with sleep disturbances. In Fin-

land, suicide (17%) and accident were over-represented causes of death among anaesthetists in comparison with other physicians and with the general population [13].

Although the body of symptoms mentioned previously is described by the participants as stress related, the mechanisms by which the symptoms manifest themselves as a consequence of work situations are not clear and many extrinsic and intrinsic factors can have an influence on these mechanisms. For example, age correlated negatively with stress symptoms, and women on an average had 9% more stress symptoms than men [10,14]. These findings are in line with recent studies on stress in other work domains and clearly demonstrate that the notion of well defined nonspecific pattern of stress symptoms cannot be corroborated.

### Stress as a perception

Many anaesthesia studies as other stress research have used implicitly as a conceptual stress model: the demand-control model developed by Karasek [15]. Within this model, job-related stress is viewed as an inherently perceptual and cognitive process, which begins when an individual appraises that job demands exceed his or her adaptive resources.

Most stress studies have relied exclusively on subjective measures such as either questionnaires or interviews. Although there is a large consensus on the use of the Maslach Burnout Inventory (MBI) questionnaire to evaluate burnout, significantly different questionnaires are still used for stress assessment, which makes comparison of results and interpretation difficult.

Actually, two scales of stress seemed to meet consensus among experts: the Index of Clinical Stress in its original version in English, and the Psychological State of Stress Measure (PSSM), which is a French-language scale [16]. The Perceived Stress Scale (PSS) has good psychometric qualities but is more perceived as a measure of coping. Another tendency is to develop one's own scales of stress. The problem of this practice concerns the validity of the scale. One should first try to use existing measures that have already demonstrated good psychometric properties.

Nevertheless, although the studies on anaesthesia used different metrics, applied on different subgroups and were conducted in different countries, globally, the results provide compelling evidence that more than stress, it is burnout that constitutes a significant problem for a high percentage of anaesthetists (around 40%).

Using the PSSM questionnaire on Belgium's French-speaking anaesthetist population ($n = 151$) we found a moderate level of stress of 50.6, which is no higher than in other working populations (values higher than 60 characterize severe stress) [17]. Morais *et al.* [3], using the PSS questionnaire, also found a moderate level of stress among Portuguese anaesthesiologists ($n = 263$). In Finland, Lindfors *et al.* [10], using their own stress questionnaire, found that 68% of the Finnish anaesthetists ($n = 328$) felt stressed.

Using the MBI, Lederer *et al.* [4] found that 25.8% of the anaesthetists in Austria appeared to be at risk for burnout and 3.4% of them had already developed full-blown burnout syndrome. In Belgium, the median score of burnout was 27, which corresponds to a moderate level of burnout. A population of 40.4% was found to be in the high-level burnout group and 44.4 and 15.2% were found in the medium and low-level groups, respectively. In Portugal, the authors found a high percentage of emotional exhaustion (57.9%), a high percentage of lack of personal accomplishment (44.8%) and 90.9% of depersonalization feeling [3]. In France, Embriaco *et al.* [18] found that 46.5% of the respondents ($n = 978$) from a national survey of physicians working in intensive care units (ICUs) (including interns, residents, fellows and attending) suffered from burnout. Among the nursing staff in ICU ($n = 2392$), Poncet *et al.* [11] found that 32.8% of the respondents suffered from severe burnout. In Sweden, a high percentage of burnout that increased with strain and number of duties have also been found among anaesthetists [8].

Again, it must be reminded that these stress studies have relied exclusively on subjective measures of perceived stress, on the basis of questionnaires or interviews. Perception is a complex process, involving both individual and the environment. Some job demands are consensually judged in the recent studies as more stressful than others (such as time constraints, workload). At the same time, whether or not individuals perceive a work demand as stressful depends upon their personal, social and biological resources that may buffer the impact of job demands on job strain, including burnout.

### Stress as a transaction

Most studies on stress relied exclusively on one-shot measurement processes such as questionnaires and interviews conducted for a short duration. This setting for occupational stress studies severely limit the extent to which the dynamic dimension that underlies the stress process can be captured. Indeed, both environment and individuals are changing in the interaction with one another.

The concept of coping strategies refers to specific efforts, both behavioural and psychological, that people develop to master, tolerate, reduce or minimize stressful events. Two general coping strategies have been distinguished: problem-solving strategies are efforts to do something

active to alleviate stressful circumstances such as planning, anticipation, social support, and so on whereas emotion-focused strategies involve efforts to regulate the emotional consequences of stressful events such as acceptance, denial, behavioural disengagement, alcohol/drug use, humour, and so on. A few studies have explored these mechanisms among anaesthetists.

Larsson *et al.* [14] documented the anaesthetist's coping strategies at the beginning of their specialist education. Most of them felt that there was an insufficient and inadequate support from consultants and reported social support (asking for advice, discussion and support from colleagues, delegation of work to competent nurses) as the main and effective problem-solving coping strategy. In our study [17], 23% of the trainees felt undersupervized. Social support is probably the most well known situational variable that has been proposed as a potential buffer against job strain.

Other characteristics of the work situation such as autonomy, role clarity and feedback, and information provided by supervisors may also act as moderators. In this field of research, an alternative model of stress, namely the Effort–Reward Imbalance (ERI) model, emphasizes reward (salary, security) as a moderator of stress [19]. This model has not received much attention in anaesthesia as yet. In the Finnish study [20], work-related factors such as 'organizational justice' were found to correlate slightly better with the well-being of male population, whereas 'family life' as well as 'social support' seems to play a larger role in the well-being of female anaesthesiologists.

Recently, a new model of stress, namely the Job Demands Resources (JD-R) model, has emerged [21]. The JD-R model emphasizes the role of resources that may buffer job demands. Job resources particularly influence motivation or work disengagement when job demands are high. Two different underlying psychological processes play a role in the development of job strain and motivation. First, in the health impairment process, a poorly designed job or chronic job demands (e.g. work overload, emotional demands) exhaust the worker's mental and physical resources and may lead to burnout. The second process is motivational in nature and assumes that resources have a motivational potential and lead to high work engagement, low cynicism and excellent performance.

Recent studies on anaesthesia include the measurement of dimensions such as job satisfaction and job fitness that can buffer the impact of stress [22,23]. Anaesthesiologists reported a high or medium level of job satisfaction, job challenge and work commitment. Job strain is particularly correlated with high job demands (work overload and time constraints) and low job control perception [17,20]. This may explain the moderate level of stress found in many studies on anaesthesia. Mauno *et al.* [24•] conducted a 2-year longitudinal study on Finnish healthcare population to explore the predictive effects of multiple job demands on work engagement over time and found that work engagement was relatively stable across the 2-year period.

As an extension of the JD-R model, some studies have included personal resources as moderators of stress. We can mention here some research on anaesthesia [25] that used questionnaires such as Cattel 16PFQ to identify the personality profile of anaesthetists and provide better information about the selection procedure for the trainee anaesthetists. Results are quite general; anaesthetists would be more likely bright than dim, serious than happy, independent than dependent, shy than bold, careful than casual, and so on. Reeve *et al.* [26] distinguish two types of trainees as judged successful and unsuccessful on the basis of the assessments by seniors and compared their personal profile. The successful trainees demonstrated greater detachment, mental quickness, drive and determination, stability, high standards, self-sufficiency, openness and self-control. These personal resources may buffer stress perception. In our study, they, however, do not buffer exhaustion on anaesthetists' less than 30 years of age who showed the highest rate of burnout.

## Conclusion

The referred studies provide compelling evidence that anaesthesia is a stressful occupation even though not more than other medical occupations. More than stress, it is burnout that constitutes a significant problem for a high percentage of anaesthetists. We found a real consensus on the job characteristics that may cause stress (workload, time constraints, work organization/cooperation, etc.). Anaesthesiologists reported a high or medium level of job satisfaction and job challenge that can buffer the impact of stress. Other job characteristics such as job control and job support are lacking and so are symptoms associated with stress and burnout in anaesthetists, especially in young anaesthetists.

On the basis of these results, there do not seem to be significant differences among countries. The lack of differences suggests that, despite the fact that every hospital and country may have its own specific characteristics, the anaesthetists' job demands and resources fit into a general model that applies to many different settings. Results suggest that anaesthetists may benefit most from interventions that optimize their planning schedules, decrease their workload and increase their social support. A formal work organization can support anaesthetists by providing counsellors when problems occur in their work environment. Accident and incident conferences, wherein anaesthetists present the critical situations they

encountered, could also play a role in the social support. Organized in a positive environment, these conferences provide the opportunity to share practices and discharge overload and emotional stress.

There are, however, several methodological and theoretical issues that make a comparison difficult. First, the studies used different techniques to measure stress, were on different sub-groups and were conducted in different work environments; therefore, they do not measure the same things and do not have the same diagnostic value. Only the burnout consensually measured by the MBI questionnaire could be the object of a meta-analysis.

Second, the mechanisms by which stress and burnout manifest themselves as a consequence of the work situation are not clear. Future investigations should raise this critical issue and attempt to answer the following questions: What is the role of the work context on stress? How do different modes of work organization (training programs, cooperation/communication channels, schedules, etc.) influence the impact of stress and burnout? Only a few referred studies showed how workload, age and sex are correlated with stress.

Consequently, more research is needed to compare different work organizations and their impact on stress and burnout to identify an adapted model of work organization.

For the development of these studies in the field, it is important not only to use validated tools but also to include objective measures of job demands and job resources like expert ratings or video. Although expert observations may be influenced by the observers' bias as well as stronger halo and stereotyping effects, these so-called objective methods should help to compare data. In addition, we need longitudinal studies to obtain more reliable information on the dynamic cause–effect relationships between job demands and resources.

At a theoretical level, it is important to indicate the stress model that underlies the study and the choice of the assessment method because each model has different practical implications. The JD-C model pays attention to job demands and control. The ERI model assumes that job strain is the result of an imbalance between effort and reward. The JD-R model emphasizes the role of resources that may compensate for job demands. If resources effectively buffer the effect of job demands on strain, the advice to organizations could be to enhance resources without having to alter the level of job demands. Nevertheless, Xanthopoulou *et al.* [27] recently examined the role of three personal resources (self-efficacy, organization-based self-esteem and optimism) in predicting exhaustion and showed that personal resources did not manage to offset the relationship between job demands and exhaustion. In other words, increased personal resources do not prevent stress factors.

Although the structural equation modelling of stress and burnout should help understand the relationships between variables better, it does not prevent us from relying on observation and other qualitative techniques such as interviews to interpret the findings and generate knowledge about the most adaptive prevention approaches.

Finally, the simple (and somewhat cynical) question of why should stress be managed and reduced has not been significantly addressed in the reviewed literature. There is a common intuition that stress and burnout decrease the quality of care and patient safety but data-based evidence of that is missing in anaesthesia, particularly when quantitative relationship is envisaged. Is a lower/higher stress level linearly related to a higher/lower level of quality of care and patient safety, or do more complex relationships prevail? In an unpublished research (IEA 2006, personal communication), we found the same job demands associated with stress and with anaesthetists' errors but this does not indicate a causal relationship. It only suggests that to act on job demands, anaesthetists' well-being and patient safety should be improved. Some studies in other domains like air traffic management seem to indicate that the safest state of operations is obtained at a significant level of stress, the less safe situations being quick transitions from low to high stress, and even worse, from high to low stress. Further investigation is needed to build some valid knowledge about this aspect in the medical world.

Another research avenue that should also be investigated is whether reducing the stress level as measured with the current methodologies is really improving the anaesthetist's well-being at work.

## References and recommended reading

Papers of particular interest, published within the annual period of review, have been highlighted as:

- • of special interest
- •• of outstanding interest

Additional references related to this topic can also be found in the Current World Literature section in this issue (pp. 422–423).


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