Occupational stress and burnout in anaesthesia

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Background. Formal studies on stress in anaesthetists have usually measured stress through mental or physiological indicators. When using this approach, one must be careful not to confuse the effects of stress or outcome variables and the sources of stress or antecedent variables. To date, it seems from the literature that there is no clear evidence of a common pattern of physiological effects of stress for all the sources of stress. Furthermore, work characteristics such as job satisfaction, job control and job support may moderate the effects of stress.

Methods. We measured the effects of stress together with the sources of stress and job characteristics, using self-reported questionnaires rather than physiological indicators in order to better diagnose stress in anaesthetists.

Results. The mean stress level in anaesthetists was 50.6 which is no higher than we found in other working populations. The three main sources of stress reported were a lack of control over time management, work planning and risks. Anaesthetists reported high empowerment, high work commitment, high job challenge and high satisfaction. However, 40.4% of the group were suffering from high emotional exhaustion (burnout); the highest rate was in young trainees under 30 years of age.

Conclusions. Remedial actions are discussed at the end of the paper.

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There is a common perception that anaesthetists are exposed to stress, having the life of the patient in their hands and having to operate under different critical conditions in scheduled and emergency situations. The implication of anaesthetists’ responsibility in accident investigation increases these inherently stressful working conditions. These factors can lead to impaired health and performance. There are, however, few formal studies on stress in anaesthetists and in the rare studies available, stress is often examined through mental and physical outcomes rather than measuring the levels of stress in anaesthetists and the sources of stress in the work environment. Suicide among anaesthetists,1–2 for example, has been used as an indicator of the high stress level in the speciality. The consumption of drugs and the abuse of alcohol frequently observed in trainee anaesthetists3–5 have also been associated with extreme life conditions in the speciality. When using this approach for measuring stress, one must be careful not to confound the effects of stress or outcome variables and the sources of stress or the antecedent variables. To date, it seems from the literature that there is no clear evidence of a common pattern of physiological effects of stress for all the sources of stress.6 For that reason, our approach to stress refers to a more transactional model7–8 based on cognitive theories and coping that emphasizes the interaction between environmental demands and individual responses. We will define stress as a process by which certain situation demands are appraised by the worker as exceeding his own resources, resulting in undesirable health consequences.9 According to different authors, the effects of stress can be mitigated by having high control,10 high satisfaction,11 high empowerment [empowerment is defined as increased intrinsic task...
motivation manifested in a set of four cognitions reflecting an individual’s orientation to his or her work role: meaning, competence (or self-efficacy), self-determination and impact, and high work commitment in the job. The study of stress at work, then, should not only examine the effects of stress (outcome variables) but should also qualify the sources of stress and situational factors that may decrease stress levels by improving an individual’s ability to cope with a stressful situation. In the following, we intend first to measure levels of stress and burnout in anaesthetists using self-reports and questionnaires, and secondly to further identify stressors and work characteristics to propose strategies for alleviating stress.

Materials and methods

In order to both measure the level of stress in anaesthetists and qualify the sources of stress, we combined different instruments: the psychological state of stress measure (PSSM-A) to measure the level of stress; the subscale of emotional exhaustion to measure the burnout level; the self-reported physical health scale to identify some negative health consequences; the working conditions and control questionnaire (WOCCQ) to measure the level of control in the work situation; the problematic job situations questionnaire to list the most frequent problematic situations; and the job characteristics questionnaire to measure some characteristics in the job that, as mentioned before, affect the effects of stress.

The PSSM-A provides a measure of stress and consists of 25 items that refer to a stress reaction (e.g. I am strained or nervous; I feel pressed for time; I tend to miss out meals or forget to eat...). The response format is an eight-point Likert scale. Normative scores are available. A moderate level of stress can vary from 40 to 60, with a mean of 50. Values higher than 60 characterize severe stress.

The subscale of emotional exhaustion provides a measure of burnout. Burnout is a concept that consists of three dimensions: emotional exhaustion, depersonalization and lack of personal accomplishment. Practically, the use of the subscale of emotional exhaustion alone (nine items) appears to be a valid measure of professional burnout.

The subject is asked to answer each item on a scale from 1 (never) to 7 (every day). The level of burnout can vary between 9 and 63, a score of 9–18 representing a low level, 18–29 a moderate level and values higher than 29 characterizing severe burnout.

The self-reported physical health scale (adapted from Etienne) lists the negative health consequences of stress. The subject is asked to give the extent to which he/she has been subject to 25 described health problems such as headache, stomach ache, ulcer, allergy and myocardial infarction. These problems were listed in collaboration with one senior anaesthetist. The response format is a five-point Likert scale from ‘not at all’ to ‘extremely’.

The WOCCQ is a multidimensional scale to measure the control that a worker has in his/her work situation. It was developed in our Work Psychology Department to qualify control at work and has been validated on different populations. It has the advantage of encompassing six dimensions of control, allowing a more precise diagnosis about the job demands at work: control of resources, task management control, risk control, planning control, time management control and future control. Each item refers to a job characteristic phrased in the first person, such as ‘I see my work piling up without being able to resolve latencies’, ‘I believe in the future of my job’, ‘I can say something about the way work should be done’, ‘I can adapt my work pace as I want’. The questionnaire response format is: 1=rarely or never applicable to my job; 2=sometimes applicable to my job; 3=regularly applicable to my job; 4=almost always or always applicable to my job. The formulation of the items could easily be interpreted in terms of control. The valence of the items was balanced. Scores for all scales used in the analyses were composed by calculating the mean score of the items on each scale. Higher scores reflect better job control.

The problematic job situations questionnaire was developed to complete the WOCCQ by a qualitative analysis of the more problematic situations encountered by the anaesthetists. This was done by asking one open question: ‘As part of your work, please cite three "major problematic situations" you meet’. For each described situation, the anaesthetist also had to indicate, on Likert scales, to what extent the situation was either stressful or frequent.

The job characteristics questionnaire was adapted from Stordeur and colleagues to provide a measure of empowerment (eight items), work commitment (two items), job challenge (two items) and job satisfaction (one item) among anaesthetists with a five-point Likert scale response format from ‘agree not at all’ to ‘agree completely’.

After institutional ethical approval was obtained, the questionnaires were sent to 318 French-speaking anaesthetists working in the Belgium University Network. A reminder was sent to those who had not returned their questionnaires 1 month later.

Statistical analysis

For the stress, burnout and job characteristics variables, a median score and range were calculated. Comparisons of these variables between training level groups were performed using the Kruskal–Wallis test. All paired comparisons were evaluated using the Mann–Whitney U-test. Comparisons in categorized burnout between age groups were performed using the $\chi^2$-test. A Friedman test (with separated measures) was used to compare control dimensions, to reduce type I error. The Mann–Whitney U-test was used to compare anaesthetists with Belgian workers previously studied by our department ($n=2452$ including police-
Stress in anaesthetists

Table 1 Median stress level according to the level of training. Data are median (range)

<table>
<thead>
<tr>
<th>Level of training</th>
<th>n</th>
<th>Stress level (standardized score)</th>
<th>Health complaints</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year</td>
<td>34</td>
<td>50.5 (36.8–69.5)</td>
<td>33 (25.0–51.4)</td>
</tr>
<tr>
<td>Second year</td>
<td>30</td>
<td>50.5 (38.0–72.0)</td>
<td>34 (27.0–50.0)</td>
</tr>
<tr>
<td>Third year</td>
<td>15</td>
<td>58.0 (40.4–74.0)</td>
<td>37 (29.0–49.0)</td>
</tr>
<tr>
<td>Fourth year</td>
<td>22</td>
<td>51.2 (36.8–63.5)</td>
<td>31 (27.0–42.5)</td>
</tr>
<tr>
<td>Fifth year</td>
<td>18</td>
<td>48.3 (40.8–66.0)</td>
<td>34 (27.0–40.0)</td>
</tr>
<tr>
<td>Senior</td>
<td>32</td>
<td>49.5 (34.5–69.5)</td>
<td>32 (25.0–42.0)</td>
</tr>
</tbody>
</table>

Table 2 Level of burnout according to age. Data are numbers of anaesthetists

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;30</td>
<td>4</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>30–35</td>
<td>8</td>
<td>21</td>
<td>12</td>
</tr>
<tr>
<td>&gt;35</td>
<td>11</td>
<td>12</td>
<td>15</td>
</tr>
</tbody>
</table>

men, office workers and hospital staff). Spearman’s ρ correlation coefficient was performed between stress and job control dimensions. Significance was assumed for a P-value <0.05. A multiple linear regression was also used to explain stress by job control dimensions.

Results

One hundred and fifty-one (48%) questionnaires were returned and included in the analysis. Fifty-three forms were returned by women anaesthetists and 98 by men. Thirty-two forms concerned senior anaesthetists (staff grade) and 119 residents from first year to fifth year: first year, 34 forms; second year, 30 forms; third year, 15 forms; fourth year, 22 forms; fifth year, 18 forms. The mean age of the whole group was 32 (range 25–65) yr.

The median stress level in anaesthetists measured with the PSSM-A was 50.6 (range 34.5–74.0), which is no higher than we found in other working populations (50.6 in policemen, 51.3 in office workers). The interindividual variability of scores was high: 17.9% of the anaesthetists were in the high-level group and 72.8% and 9.3%, respectively, in the medium- and low-level groups. The third-year anaesthetists showed the highest scores (Table 1) but the difference in stress scores between the six training level groups was not significant (H(5,151)=5.45; NS). However, there was a difference in physical health score between the third-year group and the fourth-year and senior training level groups (H(5,151)=13.07, P<0.05). The most frequently reported health problems were headache (15%), stomach ache (12.5%), intestinal ache (7%) and ulcers (6%).

The median score for burnout was 27 (range 10–59), which corresponds to a moderate level according to the normative scores. As for the stress scale, the interindividual variability of scores was high: 40.4% of the anaesthetists were in the high-level group and 44.4% and 15.2%, respectively, were in the medium- and low-level groups. Anaesthetists under 30 yr of age showed the highest rates (Table 2) (χ²(4)=13.674, P<0.01).

Anaesthetists felt a lack of control (Table 3) mainly over time management (overtime, difficulty taking a break and planning non-clinical tasks such as lectures, scientific research, etc.), work planning (difficulty in getting the work schedule in advance, frequent changes during the day), and risks (P<0.05). There was a significant difference in these control dimensions (P<0.0001) and in the resource dimension (P<0.03) between the anaesthetists and the other workers. Anaesthetists felt more confident about their future than did other workers (P<0.0001). Problematic situations collected through open questionnaire were categorized into five groups. The most frequent referred to ‘work organization’ (35%) (e.g. unpredictability of schedules, lack of coordination within the team, length of workdays, inappropriate supervision). The other groups were ‘inherently difficult job situations’ (e.g. difficult intubation or recovery) (25%), ‘interpersonal relationship conflicts’ (e.g. lack of communication within the team, with the surgeon etc.) (17%), ‘doubt and pressure on responsibility’ (e.g. fear of human error, inappropriate competence) (16%) and ‘life-career worries’ (7%).

Anaesthetists reported high levels of job satisfaction, job challenge, work commitment and empowerment. There was a significant difference in these dimensions between anaesthetists and hospital staff (Table 4). Only empowerment scores were statistically different between the six training level groups (H(5,151)=16.68, P<0.01). Post-hoc comparisons (median scores: first year=26; second year=27; third year=28; fourth year=26; fifth year=30; senior staff, median score=30) showed further significant differences in this measure between first-year residents and senior staff (P<0.05) and between fourth-year residents and senior staff (P<0.05).

As expected, there was a negative correlation between stress and control scores (P<0.01). Almost 40% of our variance of stress was explained by job control variables (F(6,144)= 15.756, P>0.001; Adj.R²=0.37).

The median scores for each variable were calculated separately for men and women as well as for the total group. The sexes differed significantly in only two variables: men indicated a higher level of empowerment (Adj.Z=3.94, P=0.05) and control risks (Adj.Z=3.69, P=0.0002).

Discussion

The current study revealed a moderate level of stress in anaesthetists that was no higher than in other professional groups. This is surprising in light of the inherently stressful working conditions. Different authors have found that stress levels can be mitigated by having high authority and high satisfaction in the job. Our results concur with this statement. Anaesthetists showed high empowerment, high
work commitment, high job challenge and high satisfaction, which in turn may have moderated the stress levels.

Nevertheless, results of the current study showed that 40.4% of the anaesthetists were suffering from high emotional exhaustion; the highest rate was in young residents under 30 years of age. These results are particularly alarming. Moreover, first-year residents did not feel as empowered as the others. Surprisingly, fourth-year anaesthetists also showed a low score for empowerment. It is well recognized among Belgian anaesthetist supervisors that the third year of training is particularly critical because this is when the trainees start to work on their own in the operating room, calling for help when problems occur. In fact, the third-year anaesthetists showed the highest stress scores in our study, but there were no significant differences between the six training levels. The lower self-confidence score found in fourth-year residents may come from this critical year. Results also indicated that 23% of trainees felt under-supervised (cf. problematic situations) and some authors have demonstrated that support can alleviate job stress.23 Together, the lack of empowerment and the lack of support, by decreasing the individual’s ability to cope with stressful situations, could explain the high score for emotional exhaustion found in the young anaesthetist group.

What can be done to alleviate job stress and burnout? The results of the WOCCQ and problematic situation questionnaire indicate major job stressors in anaesthesia. The ‘work organization’, more specifically the lack of control over work, time planning and risks, the lack of supervision, and communication within the team, especially with the surgeons, are perceived as the major sources of stress. These results agree with the major stressors listed by the Association of Anaesthetists’ Stress Seminars Study reported in Dickson’s editorial.24 These sources of stress also refer to the factors associated with human error most frequently reported in the literature.25 26 These stressors are things that the hospital and department administration can do something about in their managerial role since the major perceived demands are on work management and time management. Formal work organization can support trainees by providing advice and specialist counsellors when problems occur in their work environment. They can provide time to acquire knowledge, to manage research and to take a break during the day for eating and rest. Accident and incident conferences, in which anaesthetists present the critical situations they encountered, could also play a role in the social and emotional support in the case of major misadventures. Organized in a positive social climate, these conferences give the opportunity to discharge overload and emotional stress. The simulator, which is increasingly used for crisis-management training, can be of some help in improving communication and problem-solving strategies. Improving social support in the professional setting is vital if the individual is to better manage the effects of stress and, in doing this, organizations often reduce the constraints on the workers. However, although social support is a way for individuals to control or modify their capacity to cope with stressful situations, it does not directly decrease the sources of stress. Changing the work environment to eliminate or minimize the sources of stress would be a more useful strategy.

The present study has its limitations. The study sample size is relatively small and is focused on French-speaking anaesthetists working in the Belgian University Network. Some results, such as the high level of stress management, may reflect the academic nature of the sample. They may also reflect the country of origin. We were not able to compare the anaesthetic groups with other doctors at the time of the present study. The question also arises as to whether the proposed strategies for alleviating stress would enable the trainees to better cope with stressful situations and recover from a high level of burnout. Further work should address these issues in order to better cope with stress at work.

Table 3 Median levels of control for anaesthetists in relation to worker populations studied previously. Data are median (range)

<table>
<thead>
<tr>
<th></th>
<th>Anaesthetists (n=151)</th>
<th>General workers (n=2452)</th>
<th>Adj.Z</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources control</td>
<td>2.78 (1.7–3.5)</td>
<td>2.88 (1.7–3.9)</td>
<td>–2.16</td>
<td>0.03</td>
</tr>
<tr>
<td>Task management control</td>
<td>2.93 (2.0–3.9)</td>
<td>3 (1.5–3.9)</td>
<td>–0.98</td>
<td>n.s.</td>
</tr>
<tr>
<td>Risks control</td>
<td>2.71 (1.7–3.5)</td>
<td>3 (1.5–3.9)</td>
<td>–8.65</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Planning control</td>
<td>2.50 (1.5–3.3)</td>
<td>2.66 (1.2–4.0)</td>
<td>–6.79</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Time management control</td>
<td>2.21 (1.3–3.3)</td>
<td>2.71 (1.3–4.0)</td>
<td>–10.28</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Future control</td>
<td>3 (1.9–3.9)</td>
<td>2.72 (1.3–4.0)</td>
<td>6.92</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Table 4 Median scores on some job characteristics which may moderate the effect of stress

<table>
<thead>
<tr>
<th></th>
<th>Anaesthetists (n=151)</th>
<th>Hospital staff (n=431)</th>
<th>Adj. Z</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job satisfaction</td>
<td>1–5</td>
<td>4 (1–5)</td>
<td>3 (1–4)</td>
<td>–11.78</td>
</tr>
<tr>
<td>Work commitment</td>
<td>2–10</td>
<td>8 (4–10)</td>
<td>6 (2–8)</td>
<td>–13.41</td>
</tr>
<tr>
<td>Job challenge</td>
<td>2–10</td>
<td>9 (4–10)</td>
<td>6 (2–8)</td>
<td>–15.10</td>
</tr>
<tr>
<td>Empowerment</td>
<td>8–40</td>
<td>28 (18–38)</td>
<td>25 (14–32)</td>
<td>–7.38</td>
</tr>
</tbody>
</table>
Acknowledgements
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