

BRIEF RETROSPECTIVE ANALYSIS OF THE COMPLEX RELATIONSHIP BETWEEN STRESS, SURGERY, AND PSYCHOLOGY

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Abstract

Psychological stress influences the state of health and the appearance of diseases, by disturbing the reactivity to stress. Surgeons and surgical residents are exposed to intense stress with both professional and personal implications because surgery is a high-risk profession where small errors of judgment or technique can have immediate and irreversible negative consequences. Among the medical specialties, surgery was strongly associated with a very long work schedule which can affect surgeons and surgical residents of both genders. But, in certain circumstances, gender differences may be important for the profession of a surgeon. For all, surgeons and surgical residents, psychological interventions may have beneficial effects on operative stress modulation and improving surgical results. Thus, coping strategies, mental rehearsal, and relaxation, improve technical skills, decision making and confidence, surgical performance for teamwork, and also reduce stress.

Keywords: stress; surgery; surgical residents; psychology

Introduction

Stress, reflected in anxiety, depression, and hostility, is a psychological state that can affect a person's health in various ways (Davis, 2009) and can

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influence the evolution of long-term and short-term illnesses, as well as health recovery (Falagas et al., 2010). Acute psychological stress activates the sympatho-medullary-adrenal system and the hypothalamic-pituitary-cortico-adrenal axis (Turner et al., 2020). Stress reactivity is a predictor of health and possible illness (Turner et al., 2020). A very common form of stress is also the burnout syndrome (Arora, Diwan, & Harris, 2013). Although medicine, especially surgery, is a demanding profession in which high levels of burnout can be found, it has been found that health professionals, trained or educated in stress management, are few in number and the ability of doctors and surgeons to cope with work and other pressures are often left to their skills discretion (Murden et al., 2018).

Doctors and stress

Occupational stress is well known and can affect clinicians at any professional stage; however, many health professionals work under stress or the influence of the psychological consequences of stress, such as chronic fatigue, anxiety, and burnout (Parry et al., 2018). Perhaps this is why the medical field has become increasingly aware of the need to understand human factors and to determine the organizational causes that occur in unfavorable times and events (Carthey, de Leval, & Reason, 2001).

Occupational burnout is a syndrome that negatively affects the personal life and professional performance of doctors, being characterized by emotional exhaustion, depersonalization, and a low sense of personal achievement (Hui et al., 2019). Physicians face burnout and mental illness much more frequently than the general population, with sequelae that negatively affect the administrative sector, patients, and the healthcare system in generally (Lebares et al., 2018). Also, professional harassment leads to serious organizational consequences and poor employee performance and It may be indirectly a threat to patient safety (Ebrahim & Muhyaldeen, 2019).

A study has shown that one-third of 1,651 physicians of different specialties, in the UK, who responded to a questionnaire, suffered from burnout and secondary traumatic stress; of them, those who are specialists in emergency medicine and general practice seem to suffer the most; and over 100 physicians fall into the category of a high risk of burnout, secondary traumatic stress, and low satisfaction after compassion (McKinley et al., 2020).

Among the functional parameters, heart rate variation is an increasingly popular parameter for objective measurement of mental stress in the work environment, including surgery: it allows the identification of stressors during operations, determining the most stressful surgical techniques for surgeons and indicating differences in intensity of stress between performing an operation and attending a surgery (The et al., 2020).

Particularities of stress in surgeons

The lasting echo of stress reactivity on health is particularly important (Turner et al., 2020). This could explain why many doctors are no longer willing to pay a high price for their careers, to the detriment of their lifestyle (Dumelow, Littlejohns, & Griffiths, 2002). At the same time, surgery is an art, and every surgical procedure is a real live "show", which has important implications for both "interpreter" and "public" (Rui et al., 2018).

All surgeons face moments of stress in their professional and personal lives. (Balch & Shanafelt, 2010). Thus, stress among surgeons can be manifested by anxiety and depression and can destroy personal relationships, divorce, and addiction or abuse of toxins (Charles et al., 2009). Besides, burnout is associated with negative outcomes in both surgeons and patients (Arora, Diwan, & Harris, 2013).

It has been confirmed that professional tasks increase the stress level of surgeons, resulting in an exhaustion rate of 30-40% (Page, 2010). For example, orthopedic surgery is a challenging and demanding specialty, in which it has been shown that there is an association between burnout and irritable behavior during surgery (Hui et al., 2019). The gynecology specialty is also stressful and can involve notable psychological repercussions; but, although the burnout rate is high, it has been shown that this specialization offers a high degree of professional satisfaction, and those who practice it have stated that they would choose the same career if they had to choose the profession again (Cathelain et al., 2020).

Particularities of stress in surgery residents

Occupational overload, the high workload within the residency surgery program, may predispose resident physicians, as well as other health care professionals, to burnout (Thomas, 2004). Therefore, resident surgeons are subjected to a high degree of stress and exhaustion (Thomas, 2004).

Negative effects of training stress are mainly due to the sleep deprivation of surgical residents (Barger et al., 2005) and are reflected in serious medical errors (Landrigan et al., 2004) and low professional performance (Grantcharov et al., 2001). Thus, changing working hours and establishing a national curriculum based on simulation could reduce professional stress (Page, 2010).

Occupational stress of resident physicians has profound implications for their health and professionalism, as well as for patient care (Eisenach et al., 2014). Perhaps this is why, in training surgeons, it has been shown that strategies are needed to create a positive culture during surgical preparation, to avoid the risks of stress and burnout (Ebrahim & Muhyaldeen, 2019).

The work schedule for surgeons and surgery residents

Surgeons being considered "married" to their careers. Compared to other professions, doctors have a longer work schedule and greater exposure to a shift schedule (on duty) (Theorell, 1989) and report several negative life events, (Theorell & Emlund, 1993) but, on the other hand, they also have a more stimulating work compared to other professions (Theorell, 1989). Also, during a working day, doctors react emotionally, both positively and negatively, more than those with other professions (Theorell, 1991).

Over time, the effects of work program regulation on surgical education have proven to be uncertain (Pape & Pfeifer, 2009) or poor (Harris et al., 2015).

For example, a Swiss program proposed, for residents and specialists, a reduction in the number of hours worked in a week, as follows: a 14-hour day and night work schedule, including all breaks; rest time equal to or more than 11 consecutive hours; overtime not exceeding 2 for an employee and not exceeding 140 hours per year; within 4 weeks, maximum 7 days of guard duty, and after performing the last guard, a doctor can no longer be on duty for the next 2 weeks (Businger, Guller, & Oertli, 2010).

Some effects of limiting the work schedule on patient care and resident education have been considered unfavorable (Breen et al., 2005). Thus, the improvement of the quality of life of the residents was not correlated with higher satisfaction related to their education in the medical field (Vidarthi et al., 2006). Also, technical surgical skills can be negatively influenced (Harris et al., 2015). Also, few residents believe that restrictions on working hours can improve patient care or training as a resident (Coverdill et al., 2006). American studies have shown that changing working hours has not necessarily reduced the

effectiveness of case resolution (Mendoza & Britt, 2005).

Other effects were considered beneficial. For example, reducing the work schedule would be important for increasing the quality of life, improving sleep, and reducing fatigue. (Harris et al., 2015). Other studies show that reducing the worked hours may increase practical experience (Hutter et al., 2006). Also, female residents consider the program restrictions to be favorable (Coverdill et al., 2006).

Therefore, the effects of the work schedule of surgical residents on their education, quality of life, and safety continue to be a concern at present as well (Baldwin, 2015).

Gender differences in physicians regarding the perception of stress

Medical men have proved an unsatisfactory strategy for family life; in contrast, female physicians have demonstrated a better career and family strategy and better psychophysiological reactions when arriving home after work, than male physicians (Theorell et al., 1987).

In some contexts, gender differences are not noticeable, for example, in Sweden, both women and men doctors have high professional requirements and a reduced ability to control their work compared to other occupations (Statistics Sweden, 1997; Szabo & Marian, 2012, 2018).

One study found that surgery residency affects male and female physicians differently; thus, in distress and burnout situations, male resident surgeons show increased depersonalization, and female resident surgeons use alcohol inappropriately, with a significant association between alcohol abuse, high depersonalization, and low anxiety, which was not observed in men; therefore, due to depersonalization, burnout scores are higher in men, but for both genders, depersonalization was found during one year of residency (Lebares et al., 2018).

Another study showed that in the case of gynaecological surgeons there are significant gender differences regarding the impact of the workload on the time they have for themselves, their family and friends: 51.8% of women, but only 18.2% of men, said they had previously suffered discrimination at the workplace; women felt that they received less recognition from their colleagues than their male colleagues, they held fewer management positions and other responsibility positions and they were less satisfied with their salaries (Cathelain et al., 2020).

Psychology and surgery

The association between surgery and psychology has been the subject of many studies, which have dealt with cardiac surgery, dental surgery, and other surgeries (Rosenberger, Jokl, & Ickovics, 2006).

For surgeons, certain psychological aspects are essential, such as finding meaning in work, connecting with colleagues, emotional self-awareness, and appropriate support systems to combat occupational distress. (Balch & Shanafelt, 2010). It has been shown that the key components of a coping strategy, in the case of surgeons, should include: the impact of stress on performance; effective coping strategies; opportunities to practice what has been learned in a safe environment (Arora et al., 2009). A misconception has been identified regarding surgeons, namely that they do not have mental health problems and can cope better with stress and are better protected from burnout than doctors with other specialties, (Parry et al., 2018).

It has been found that motor skills and surgical performance can be improved through cognitive training interventions, more than through control training have led to greater benefits compared to. In particular, cognitive training was found for, as well as several non-technical outcomes (Wallace et al., 2017). Most surgeons who participated in one study said they needed training in stress management, although they use a variety of stress management strategies; of these, some witnessed at least one intraoperative complication; it has also been found that stressors affect surgical performance and can lead to surgical complications (Anton et al., 2015).

Also, the use of progressive muscle relaxation techniques and diaphragmatic breathing by surgeons, 20 minutes twice a day for eight weeks led to significantly lower stress values (Christakis et al., 2012). In the case of obstetricians and gynecologists participating in a study, it has been shown that focused biofeedback meditation can reduce situational stress and improve mood (Allen et al., 2020).

A study of stress management conducted with residents found results in decreased depression and anxiety, increased empathy, developing knowledge about improving the effects of stress, improving coping, improving the ability to resolve role conflicts (Shapiro, Shapiro, & Schwartz, 2000; Szabo & Marian, 2012; 2018). In another study involving surgery residents, stress training was rated as valuable (Maher et al., 2013). In a study involving students, it was found

that the techniques that reduced stress and anxiety were mindfulness, meditation, self-hypnosis, and pass / fail grading (Shiralkar et al., 2013). Another study involving first-year surgery residents showed that the effectiveness of traditional technical training (TT) and quiet eye training (QET) led to increasing effectiveness and performance in making hand knots and decreasing the negative effects of anxiety on performance (Causer et al., 2014). Beside, cognitive and behavioral factors help modulate the stress that surgery residents face in the operating room (Ng et al., 2019).

Conclusions

Doctors, especially surgeons and surgical residents, are exposed to intense stress, with both professional and personal implications. Among the medical specialties, surgery was strongly associated with a very long work schedule, which can lead to multiple negative consequences. Gender differences may be important for surgeons and surgical residents. In the case of both surgeons and surgeons, psychological interventions can have beneficial effects in modulating peri-operative stress and in improving the results of surgical operations.

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