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Why is surgery not popular among medical students and young doctors? - Review of literature

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Abstract

Introduction: Contemporary medicine is witnessing significant advancements in conservative treatment modalities. However, surgery remains paramount for radical cancer treatment and emergent conditions such as trauma, peritonitis, gastrointestinal obstruction, and cholecystitis. Despite the essential role of surgeons, there is a global trend indicating waning interest among medical students in pursuing surgical specialties. Concurrently,

practicing surgeons report heightened levels of professional burnout, and many regions face a looming shortage of surgical professionals, posing a threat to healthcare quality.

Brief Overview of Current Knowledge: Research conducted across Poland, Germany, Argentina, the United Kingdom, and Japan highlights the declining inclination towards surgery among medical students. Students cite unattractive working conditions, poor work-life balance, elevated stress levels, and limited avenues for scholarly growth as deterrents. Gender plays a role, with females expressing heightened concerns regarding work-life balance and family aspirations. Furthermore, the surgical work environment, inadequate preparatory training in medical schools, and prolonged working hours are identified as factors exacerbating burnout risk among surgeons.

Summary: Professional burnout represents a significant concern among surgeons, impacting both their work satisfaction and patient safety. Despite the strides made in conservative medical therapies, surgery remains indispensable, yet its allure as a specialty is diminishing among medical students. Understanding and addressing the discouraging factors, along with promoting healthy work practices, may mitigate burnout and encourage young physicians to consider surgical careers.

KEYWORDS: medical education, surgery, medical students, career choice, stress

Introduction

Despite the improvement of conservative medicine treatment methods, surgery is still the method of choice for radical treatment of cancer and emergency conditions such as wounds, peritonitis, mechanical obstruction of the gastrointestinal tract or cholecystitis. Surgeons must complete medical studies and undergo residency. According to recent reports, surgical specialties around the world are not popular among medical students. Publishers from countries such as Poland[1], Germany[2], Argentina[3], Great Britain[4], Japan[5] indicate a decline in students' interest in this part of medicine.

The shortage of surgeons may soon become a global problem. In 2021, according to the Association of American Medical Colleges (AAMC), 51% of general surgeons in the US were 55 years of age or older.[6] In 2020, the average age of a surgeon in Poland was 55.[7] Meanwhile, in Japan, the number of surgeons has decreased by 25% over the last 20 years.[8]

Students are not interested in surgery.

In a 2020 study among 595 Polish medical students Skorus noticed that most students were interested in taking up surgical specialization at some stage of their studies.1–3-year students were much more likely to declare interest in surgery than 4–6-year students. The discouraging factors included working hours, work-life balance, stress level, standing position, and little opportunities for scientific development. Students who resigned from choice surgery most often indicated that they were discouraged from changing their desired specialization by non-surgeons, surgeons themselves and other medical students. In turn, students interested in surgical specializations indicated expected income, job satisfaction, manual work and quick treatment effects as the main encouraging factors.

The study draws attention to a quite large difference in interest in surgery between 3rd and 4th year students, amounting to 31 percentage points. During the third year of their studies, Polish students begin classes at the surgery department. The authors explained the phenomenon by the fact that expectations are inconsistent with reality, and also noted that a student who enters the operating room for the first time after the second year has a greater risk of abandoning plans for surgical specialization.[1]

Another study included 261 Harvard students, 22% of women and 27% of men were interested in surgery. 64.7% of women and 60.7% of men stated that they were verbally discouraged from taking up surgical specialization. However, the authors noticed other discouraging factors to undertake surgical specialization depending on gender. 72.7% of women and 1.5% of men were discouraged from having surgery because of their gender, 29.3% of women and 1.5% of men were discouraged from having surgery because of their age, and 72.7% of women and 56.9% of men were discouraged because of attention to family aspirations.

The surveyed man stated that they assessed negatively Work hours (85,9%), Stress levels (66,1%), time for outside interests (90,6%), length of residency (58,1%), personality fit (54,3%) They assess positively: Expected income (30%), personality fit 17,4%.

The surveyed women stated that they assessed negatively: work hours (93,9%), stress levels (79,1%), time for outside interests (93,4%), length of residency (75%), personality fit (65,3%). They assess positively: expected income (26,6%, personality fit 22,2%.

Moreover, in the study women were more likely than men to be afraid that a career in surgery would not allow them to find time for matrimonial matters, maternity leave, or raising a child.

75.7% of them were afraid that after completing their residency they would be too old for motherhood.[9]

In a study of 932 final-year medical students from the UK, researchers noted the low interest in surgery among the respondents. Students did not decide to choose surgery due to problems with reconciling surgery with lifestyle/family commitments (538). Students did not feel well prepared to start surgical specialization due to poor anatomy teaching at medical school 528, strong competitive (511) and aggresive surgical culture (448).[10]

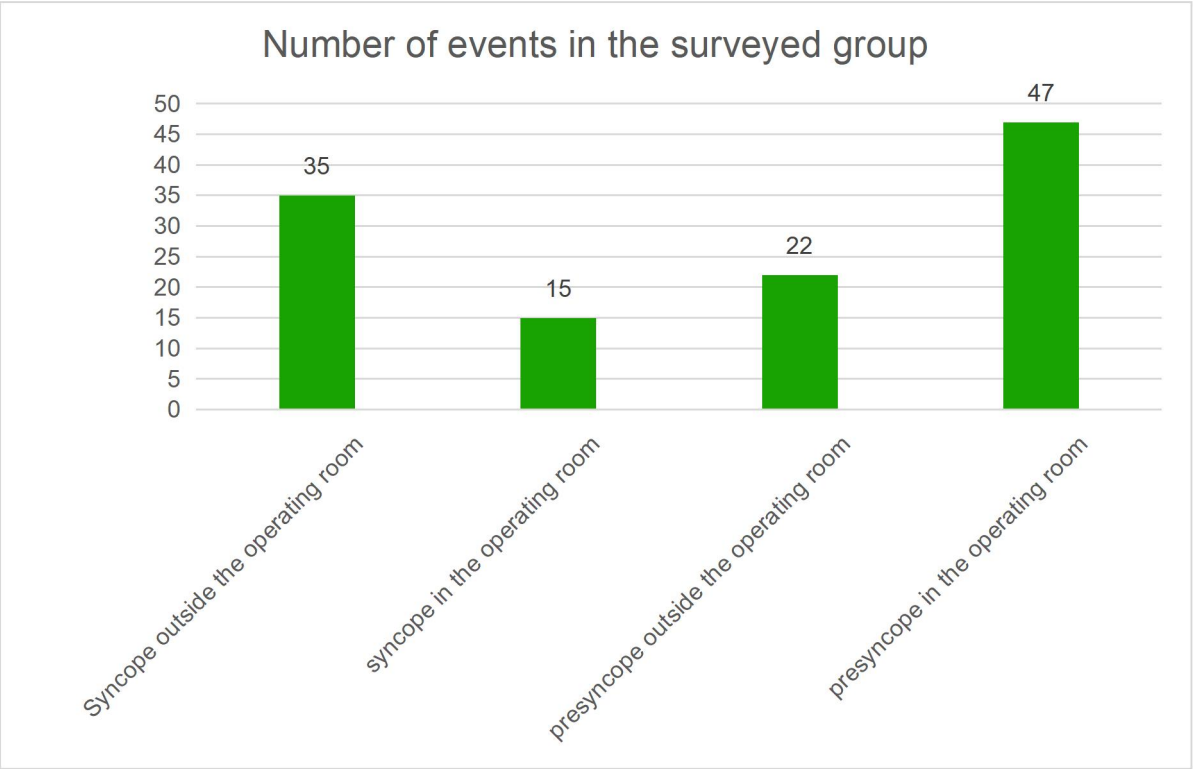
Health factors

Health factors in the context of choosing surgical specialization by medical students can be understood in two ways. Both as individual factors that may make work as a surgeon difficult, as well as diseases that work at the operating table may lead to. Both of these issues will be discussed below.

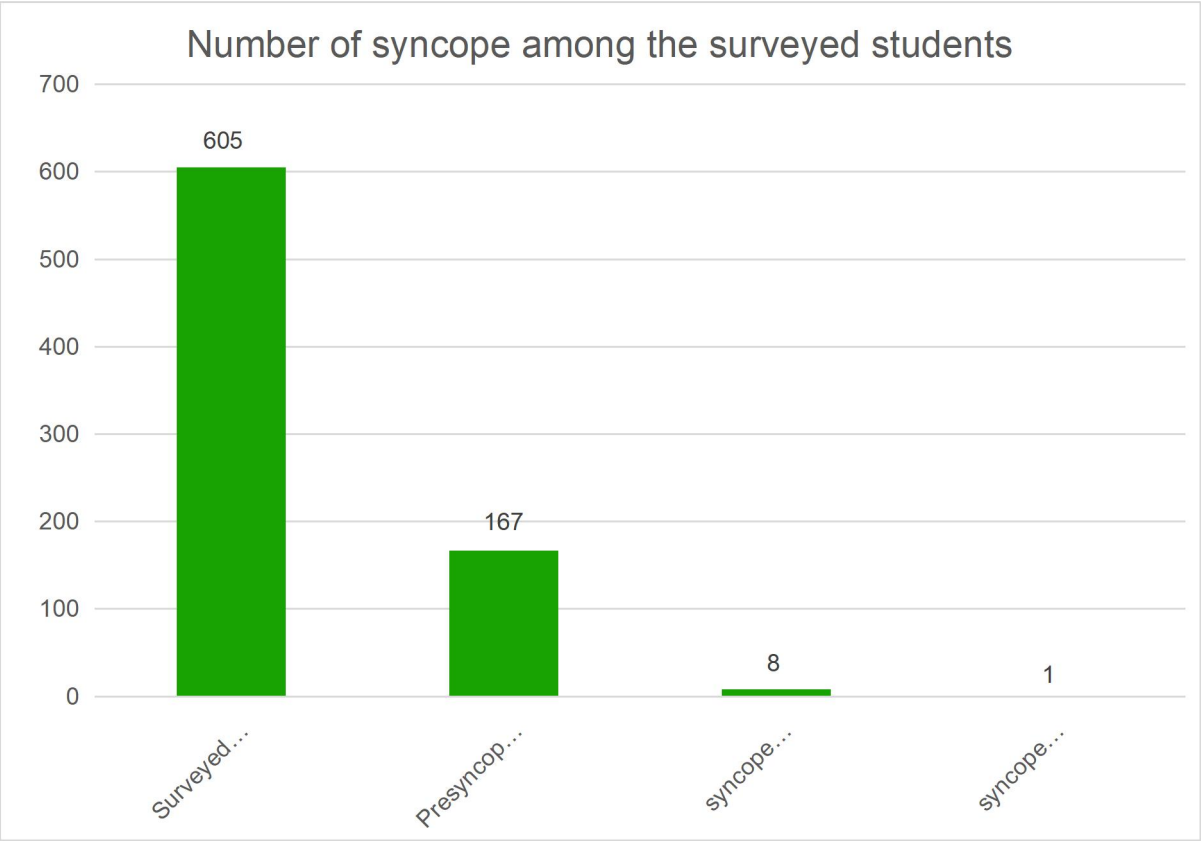
Syncope

Syncope is a loss of consciousness and muscle strength characterized by a fast onset, short duration, and spontaneous recovery. When consciousness and muscle strength are not completely lost, it is called presyncope. [11] The causes of syncope during surgery include the sight of blood, the need to stand for a long time in an uncomfortable position, and the handling of sharp instruments. The smell emanating from the operated patient and the burnt tissue also plays an important role. Women have lower orthostatic tolerance compared to men. This is especially visible with increased external heat. [12] The future choice of a doctor's specialization may be influenced by whether someone has had a history of syncope.[13]

The study by Jerzy Rudnicki et all concerned Risk for Syncope and Presyncope During Surgery in Surgeons and Nurses among 317 employees surveyed. The collected data indicate that as many as 5% of them had syncope, and presyncope in 15%. The estimated incidence of syncopal events has been estimated to be approximately 1 in 100,000 surgeries. Syncope outside the operating room occurred in 35 people (11% of the total population), while syncope in the operating room occurred at least once in 15 people (4.7% of the total population). Moreover, the frequency of presyncope events in the operating room was also examined, which were reported by 47 subjects (14.8% of the total population), 15 of them had either syncope or presyncope, 32 had only presyncope. However, presyncope outside the operating room was reported in 22 employees. It is indicated that such an incident may have a negative impact on the course of the operation and further consequences for the operated patient.[14]



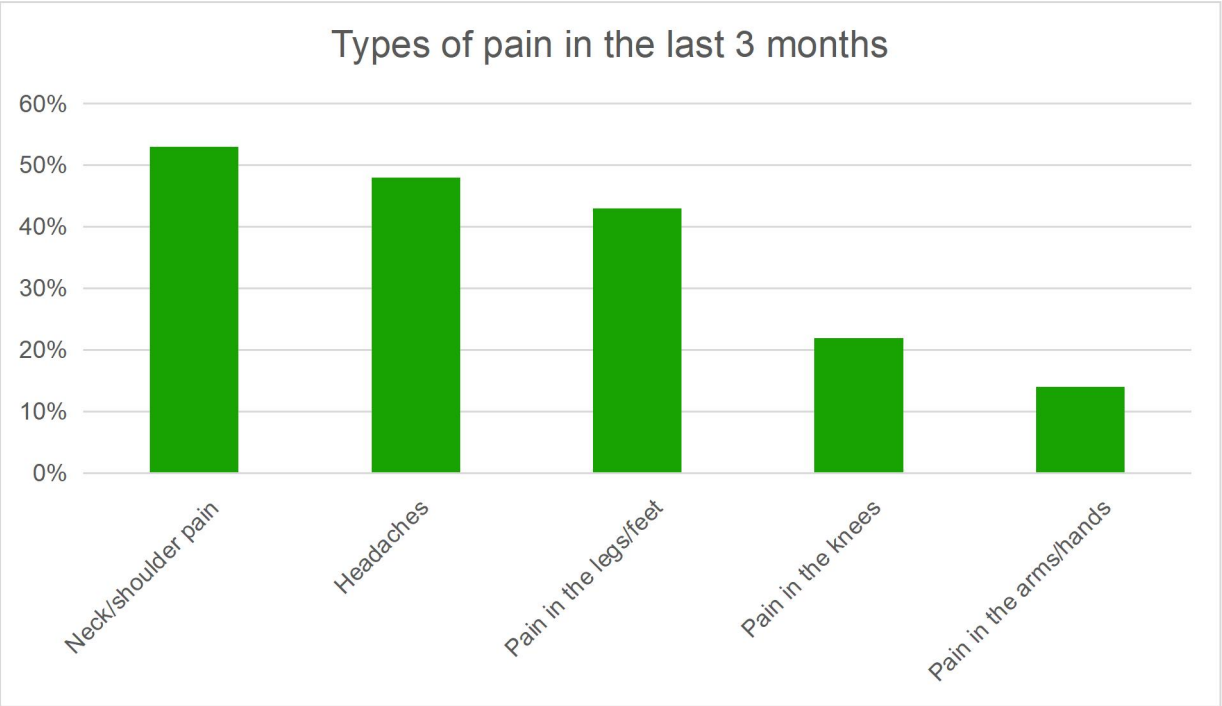
The study by Jerzy Rudnicki et all conducted on 605 medical students from 5 medical universities showed that syncope outside the university or during classes (during surgical procedures, autopsies) influences the choice of specialization. In the study group, 15% of women and 30% of men declared their willingness to undertake surgical specialization. The data obtained by the researchers showed that 167 medical students (27.6%) reported fainting episodes outside the university, 8 (1.28%) students had a syncope episode during surgery, and one student (0.16%) had a syncope episode during an autopsy. In turn, after taking into account the division by gender, it was noticed that syncopal events during surgery were more common in women than in men (1.9% vs. 0%). The study provided several conclusions. The first is that the incidence of syncope among medical students is similar to that in the general population. Additionally, they occur twice as often in women, which is also characteristic of vasovagal syncope. The second conclusion is that male gender and the absence of a history of syncopal events are justified as factors determining the choice of surgical specialization by a medical student. Another conclusion is that when choosing a specialization, medical students consider the incident of syncope in the operating room to be more important than the incident outside it. [15]

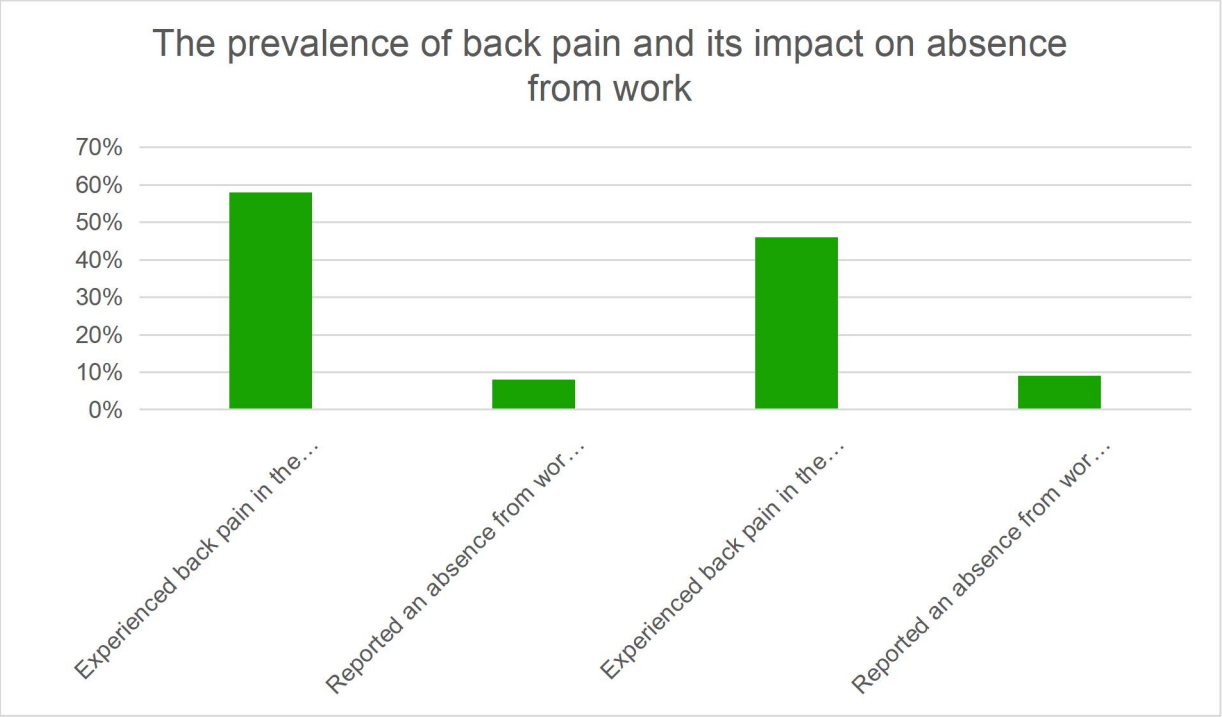


Standing position while working

An inherent part of the job is the need to stand for long periods of time while performing surgery. Unfortunately, long episodes of standing can negatively impact several aspects of your health. The most common are diseases related to the skeletal system. [16–21] Pathophysiologically, this can be explained by disruption of the blood supply to the tissues as well as damage to the cartilage. [22]

In the PAUL MEIJSEN et all study, which involved 463 operating room workers from 16 hospitals in the Netherlands, Work-Related Musculoskeletal Disorders were examined. Respondents were asked about the various forms of pain they had experienced in the last three months. The most frequently reported pain was neck/shoulder pain (53%), followed by headache (48%), pain in the legs/feet (43%), pain in the knees (22%), pain in the arms/hands (14%). Back pain is a separate issue, where people were asked whether anyone had experienced back pain in the preceding 12 months (58% of parcipitants), as well as whether they reported an absence from work because of back pain (8% of parcipitants). In turn, during the last 3 months, 46% of workers experienced back pain in the preceding 3 months and 9% reported an absence from work because of back pain. [17]





Mental health and stress

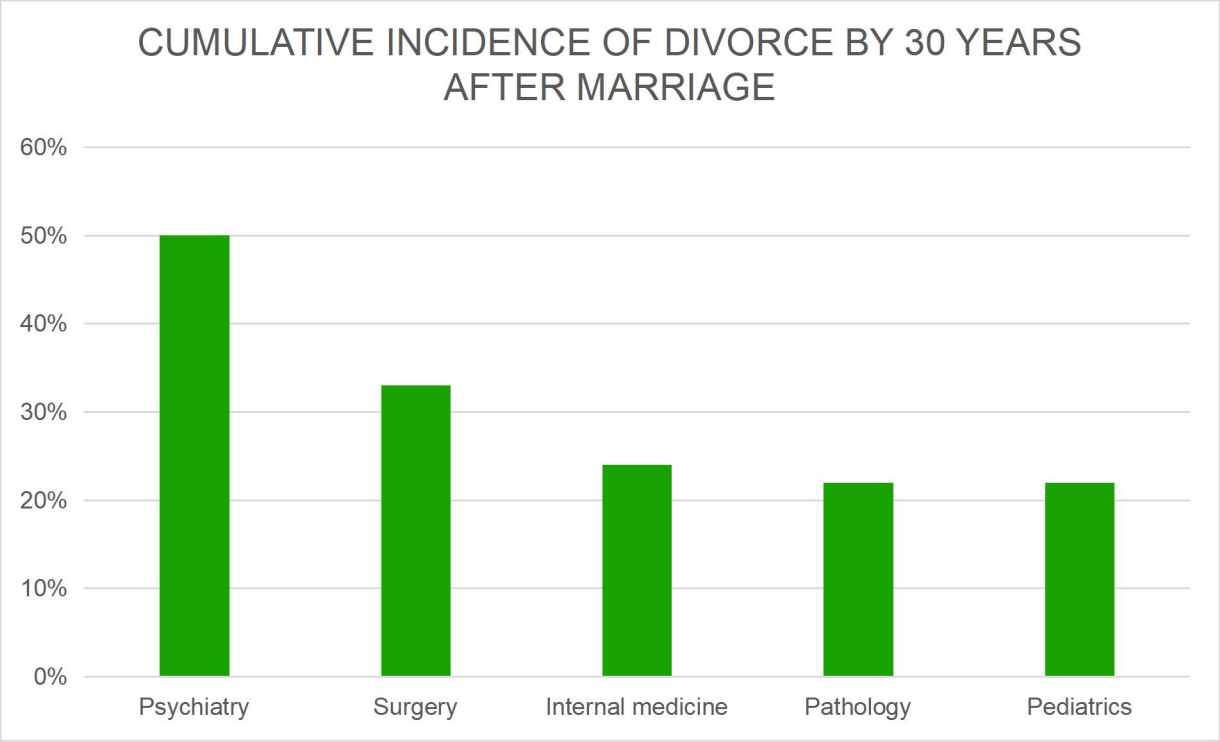
Surgical specialties are widely considered to be the most stressful. This has a significant impact on health. This can be seen as a huge disadvantage when choosing a career path for medical students. Selected aspects of mental health in surgical specializations will be discussed below.

Suicide

Surgeons have an increased risk of committing suicide. Compared to other professions, the risk is increased 1.5-4.5 times. [23–25] This issue is being discussed more and more often in surgical environments. Fortunately, it is slowly becoming less of a taboo and seeking help is not seen as a weakness.

Divorce

Bruce L. Rollman et al found that medical specialty appears to be associated with divorce risk among physicians. The highest risk of divorce after 30 years of marriage was among psychiatrists 50%, followed by surgery 33%, internal medicine 24%, pathology 22%, pediatrics 22%. [26] It seems to be related to the number of hours spent at work.[27,28] Moreover, the risk was greater when the surgeon was a woman than when it was a man.



Burnout

This topic has been the subject of many scientific studies. It is estimated that the burnout rate among surgeons is approximately 35%.[29–33] This has a negative impact on both work comfort and patient safety by increasing the number of medical complications.[34–37]

In a study by D A Campbell Jr et all on a group of 582 general surgeons, a high level of emotional exhaustion was found in 32% of them. Moreover, it was strongly associated with the desire to retire earlier.[38]

Among 549 members of the Society of Surgical Oncology, 28% of respondents met the burnout criteria. This was published in a study by Henry M Kuerer et al, who also found that 10% of respondents would have met criteria for major depressive disorder at the time of the study if they had undergone a full psychiatric evaluation. Moreover, junior oncology surgeons were at greater risk of burnout.[39]

The prevalence of burnout was estimated at 38% among transplant surgeons in the study by Bertges et al. Professional development support was rated as helping to avoid burnout. [40]

Burnout among members of the American College of Head and Neck Surgeons and the Society of Head and Neck Surgeons was also examined. In Johnson et all's study, 34% of respondents reported burnout. Among the factors influencing this was stress related to long hours of work.[41]

Pregnant woman vs work

The physical, psychological and maternal health of pregnant healthcare workers is significantly impacted by workplace environment. There are many work-related ergonomic stressors which have effect on pregnancy. It is crucial to implement appropriate practices to resolve these stressors which can result in spontaneous abortions, preterm delivery or low birth weight babies.

Physiological changes in pregnancy

There are many physiological and pathological changes that arise during pregnancy such as changed balance, pain, gait and spinal curvature. The changes occur to meet the increasing demands of developing featus and prepare for labour but unfortunately they also influence the expecting mother’s quality of life. Abnormal confitions can cause tiredness, varicose veins, back pain, muscular cramps, poor sleep quality, anaemia, fluid retention and physiological oedema. [42]

Standing at work and prolonging working hours

The results of a study on a group of 8711 pregnant women conducted by Henriksen et al showed that standing and walking at work during the second trimester may present a particular risk for preterm delivery. [43]

On the other hand, the research by Pompeii et al conducted on 1908 women pregnant with a singleton gestation revealed that patients who lifted or stood at least 30 hours per week had no significant elevations in preterm delivery. Working at night (10:00 PM to 7:00 AM) caused a 50% elevation in the risk od preterm delivery but working at least 46 hours per week reduced the risk by 40%. [44]

The results of anonymous, voluntary online survey completed by 1021 female surgeons showed that the overall reported complication rate for all pregnancies among orthopaedic surgeons was significantly higher than in the general population. There was an increased risk of preterm delivery among women who worked more than sixty hours per week. The frequency of occurrence of preterm labour was at 11.1% during first pregnancy, 12.5% in second pregnancy and 20% in third pregnancy. [45]

In a study by Lawson et al analysing 6 977 live births pregnancies among U.S. female nurses was reported that working rotating shifts or nights was not associated with the risk of pretermm birth. Woman who worked part-time during first trimester were 30% less likely to have preterm birth in comparison to women working 21-40 hours per week. Despite the trend for hours worked was statistically significant, there was no correlation for working overtime and risk of preterm birth. [46]

Ionising radiation

Radiation exposure (at >100 milirems) is harmful to pregnant women and can cause miscarriages, birth defects, developmental disorders and low birth weight babies.[42,47]

In the research conducted by Zhu et al on 1025 female laboratory technicians showed that personnel working with radioimmunoassay or radiolabelling had an increased risk of preterm birth and major malformations.[48]

Another study evaluating 934 pregnant physiotherapists from Israel who used shortwave diathermy revealed that exposure to shortwaves was associated with significant increase in congenital malformations and low birth weight. This effect increased in a dose-related manner. [49]

Heavy lifting and sterilizing agents

Some studies show that physical overexertion and heavy lifting can be linked to increased risk of spontaneous abortion among pregnant women. [50,51]

In a study by Lawson et al analysing 6 977 live births pregnancies among U.S. female nurses was reported that the risk of preterm birth was moderately associated with exposure to sterilizing agents, but there was also shown that prolonged standing and heavy lifting were weak predictors. [46]

Lifting heavy weights (>10 kg) shifts the centre of gravity forward which during pregnancy affects balance and can increase the risk of falling. In addition, it also increases the risk of preterm birth. [52,53]

Surgical skill training during studies

According to research, medical students did not feel confident in performing manual procedures.[1,54] Due to the COVID-19 pandemic and related lockdowns, students' learning of practical skills has further deteriorated.[55]

In the Skorus publication, students negatively assessed learning surgery during classes and indicated their lack of self-confidence as a factor discouraging them from choosing surgery.[1] However, this is a factor that can be modified. Raising it may result in students becoming more familiar with surgical procedures, increasing their self-confidence and eliminating the fear that they will not be able to cope during the surgical residency. In recent years, medical simulation centers have been created, which allow the development of practical skills without the fear of harming a living patient.[56,57]

Summary

This article includes an analysis of factors discouraging the choice of surgery. In the works cited above, the authors pointed to factors that are not subject to modification, such as work-life balance, standing position, stress levels, but there are also factors that can be modified, such as strong competitive and aggressive surgical culture, discouragement of students by surgeons, gender discrimination. Another thing that could be modified is the level of surgical skills taught during studies. We hope that this work will contribute to increasing awareness of this problem, which in turn may result in increased popularity of surgery among medical students and young doctors.

Disclosure

Author's contribution:

Analysis and Preliminary Research: Piotr Daniel, Justyna Składanek, Michał Leśkiewicz, Karina Otręba, Joanna Cieszkowska

Planning and Designing: Piotr Daniel, Karina Otręba

Writing and Editing: Piotr Daniel, Karolina Czupryńska, Justyna Składanek

Data Analysis: Karolina Czupryńska

Scientific Verification: Joanna Cieszkowska

Summary and Conclusions: Michał Leśkiewicz

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