



Psychological assessment of medical school applicants for general surgery residencies

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Abstract

Attrition negatively impacts surgical residencies. Many factors have been reviewed to help understand ways to reduce attrition. This article focuses on how psychological assessment can be used in the area of surgery to help mitigate attrition while also helping to select candidates who are more likely to be successful in a surgical residency.

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Introduction

In previous articles, the authors have discussed the negative impact attrition has upon general surgery. In this article, we examine the psychological aspects that may help define or identify desirable traits such as grit to make one successful in this line of work to help better understand the problem. Sadly, the problem of surgical attrition can be witnessed on local and national levels. Unfortunately, exact predictors of performance and attrition have proved elusive, with multiple psychosocial variables appear to contribute to the problem of surgical attrition [20]. Some of the most common variables appear to be marriage, health, burnout (presumably caused by the number of hours worked), and lifestyle. Bullying has also been proposed as a systems-level issue that contributes to “the surgical personality” and attrition. But even in an article discussing bullying, duty hours and wanting a more balanced life were mentioned as far more important factors for making the choice of surgery more attractive [5]. Gender is a factor that often gets researched and cited in the literature. In fact, family and lifestyle issues for women were reported for being responsible for voluntary resident attrition [20]. This trend was also observed in work done by Williams and Cantillon in which women were unsure how being a female surgeon would “fit-in” for a married family-oriented woman with children.

Although the definition of lifestyle may vary among individuals, is obviously a crucial factor. Once a resident recognizes that surgery is unlikely to afford the desired lifestyle, it is unlikely he or she will successfully complete surgical training [13]. Findings from Dr. Naylor and colleagues at University of Texas-Southwestern concluded that nonacademic factors appear to be more important in predicting attrition than academic factors. This was also found to be the case in other reviewed literature, thus suggesting that employing medical school performance for recruitment is a poor predictor of successful performance in surgical residency [11,1,22,7]. Recommendations are: 1) Eliminate those at high risk from the applicant pool before the match; 2) improve resident retention; and, 3) improving resident replacement with qualified physicians. These are administered by a survey [6].

This seems to bring us back to the role of psychological or psychosocial aspects contributing to success in a surgical career. So, when is the right time to evaluate these factors? Does it need to happen as early as medical school admissions? At some universities this already does happen. Furthermore, which psychological traits are more desirable than others to ensure one’s success should they pursue the challenge of becoming a surgeon?

Desirable traits

Depending on who is asked, whether it be admissions committee members, department chairs, attending physicians, medical students or residents the list of desirable traits change from person to person. Below, we discuss personality traits that potentially make one suitable for surgery which should have the desired effect of reducing attrition and increasing the individuals job satisfaction with their career choice. Grit is a character trait defined as passion and perseverance for long-term goals. Low scores have been associated with residents contemplating leaving residency. It may be a marker for resident attrition [6]. Confidence in surgery is the ability to perform procedures and is critical for the practice of surgery. Bucholz et al have studied self-confidence in surgery residents. They have found that self-

confidence is the ability to have a realistic perception of their abilities and skill and should increase with years of training [7]. Good surgical confidence is associated with male sex, a more senior resident, being married, having children, community hospitals, programs with fewer chief residents, and programs without fellowships [7]. Experiences where residents in training actually get to perform procedures increases confidence [7]. Surgery residents with less confidence are more likely to pursue postgraduate fellowships for additional training [7].

How one handles stress has also been suggested to be related to success in life including completing a surgery residency [8]. According to a 1984 study by Linn and Zeppa, some medical students may tolerate stress better than others and may make better surgery residents [16]. Students who chose stressful careers had higher self-esteem, less anxiety, more self-confidence, less personal stress, and may even thrive in stressful environments [16]. They were also more cynical and more authoritarian [16]. Reasons for stress provided by the medical students included long hours, life or death decisions, consequences of emergency decisions, volume of work and long hours [16]. Students selecting general surgery as a residency did so with the understanding that it would be a stressful, demanding career [16].

Environmental factors

Bullying is intimidating behavior that interferes with communication, teamwork, and patient safety [5]. This disruptive behavior is seen in many surgeons typically in the operating room and postoperative rounds and may compromise patient care [5]. Overbearing surgeons are ill-mannered and ill-tempered. Bullying is a systems level issue that contributes to or may be part of “the surgical personality” and attrition. Essentially all nurses and most anesthesia residents have seen disruptive behavior in surgeons [5]. As more women matriculate into general surgery, the male dominated environment will change. Female surgery residents are more concerned with the feelings of others [5]. Nurses today are less tolerant of disruptive behavior, especially in the operating room where they have more administrative and regulatory power than in the past [5]. Morale during residency has been shown to be lower for PGY 2 and PGY3 levels compared to PGY1 and PGY5 higher levels and approximates the shifts in morale described by Menninger [8].

Psychological assessments

It is hypothesized “that there are personality trait differences between surgeons and non-surgeons” [9]. Use of psychological testing to identify traits or personality types found within successful surgery candidates or residents is a concept that has been researched but not to the extent it could be. It is necessary, then, to ask the question: which one is the most appropriate test that can provide reliable robust data? There are personality inventories such as the Personality Assessment Inventory, Minnesota Multiphasic Personality Inventory-RF, Myers-Briggs, or the Millon Clinical Multi-Axial Inventory. These tests are excellent at identifying clinical psychopathology but may not be the best instrument to use in identifying taxonomy of successful surgical candidate. Therefore, we may need to examine assessments in industrial organizational, vocational, or counseling psychology. There are already articles researching surgical goodness of fit that have employed tests of this nature such as World of Work Inventory Online (WOWI Online), the Five Factor Model, Maslach’s Burnout Inventory, or Holland’s RIASEC (Realistic-Investigative-Artistic-Social-Enterprising-Conventional) typology of careers.

In 2010 Foster et al. created psychological profiles of surgeons and surgical residents by using the World of Work Inventory Online (WOWI Online). They concluded that this tool provided a stable profile for successful surgeons and may be a useful indicator of success in surgical residency and in surgery as a profession. They also noted that most will leave surgery programs in years 1 and 2, the resident will enter another specialty besides surgery, and the most cited reason for leaving the program is "lifestyle." [13]

McCulloch, Kaul, Wag staff, Wheatcroft researched the idea of personality trait differences between surgeons and non-surgeons using the Five Factor Model. They hypothesize "There are inherent personality differences between surgical and non-surgical specialties, Personality traits change during medical training, and Specialty-related personality differences may play a role in residency selection" [9] The Five Factor Model is used to measure one's personality in the following areas:

- Extraversion- talkative, energetic, enthusiastic, and assertive
- Agreeableness- sympathetic, kind, nurturing, caring, and affectionate
- Conscientiousness- organized, thorough, diligent, good impulse control
- Emotional Stability- calm in the face of adversity (Low scores in this category were associated with anxiety, depression, and self-consciousness)
- Openness to new experiences- intellectual, creative, artistic versus conventional, conservative, prefers familiarity

The sample size consisted of 68 surgical participants (38 faculty members and 30 trainees) and 128 non-surgical participants (72 faculty members and 52 trainees). They discovered personality differences between surgeons and non-surgeons, and, furthermore, that these differences can change over medical training. Their work suggests that surgeons are significantly more conscientious and extroverted than their non-surgical counterparts. Non-surgeons, on the other hand, were found to be more agreeable. The two groups were similar in the other two categories. Surgeon trainees scored higher than surgeon faculty in agreeableness while faculty ranked highest in conscientiousness. Interestingly, both groups were equal in openness. For the non-surgical group, the attending physician scored highest in extraversion.

Lifestyle and burnout is consistently cited as primary reasons of surgical attrition. Yet, there is a lack of in-depth research into the sub areas of these broad categories. Lifestyle and burnout can be found in the realm of human factors psychology (HFP). HFP is concerned with the effects of the work environment and conditions on employee behavior. Research into this area has demonstrated that burnout cannot be simply defined by long work hours. Burnout entails emotional aspects like exhaustion, cynicism, job dissatisfaction, negative attitudes and feelings, and has been linked to increased medical errors. Burnout can have somatic effects such as increased susceptibility to flu and cold, muscle tension and fatigue, and sleep disturbances. The World Health Organization considers it a diagnosable mental health disorder [2]. Maslach and colleagues conceptualized burnout as an experience that results from a mismatch between one's values and their work setting on at least one of the following dimensions: workload, perceived control over work experienc-

es, rewards for work, sense of community, perceived fairness in the workplace, and personal ethics and values. [20] To assess for burnout, the Maslach Burnout Inventory (MBI) was created. This inventory gives total scores in the areas of Emotional Exhaustion (EE), Depersonalization (DP), and Personal Accomplishment (PA).

Elmore et al. conducted a national study of US general surgery residents employing the MBI. They discovered 69% of the 665 residents studied met criterion for burnout on at least one subscale of the MBI. Additionally, "44% of residents in our sample considered dropping out of their training program, and a greater proportion of trainees who met the criterion for burnout considered dropping out of residency training compared with trainees who did not meet the criterion for burnout. Their evidence suggests that "emotional exhaustion, a key component of burnout, and is associated with voluntary job turnover." [10] More findings from this study suggest a greater proportion of women than men reported burnout on EE and PA. Also, higher burnout on EE and DP was associated with greater work hours per week. [10] While longer work hours were associated with higher levels of emotional exhaustion and depersonalization, it was a factor independently associated with burnout.

So, what are some feasible solutions to combat burnout? Work hours can be examined. But the work in this area seems to indicate that while hours worked can be impactful it is not the only variable that will significantly impact burnout. In fact, "work-hour reform does not appear to have had a positive effect on burnout [21] or attrition in general surgery trainees. [4,12,15] Although we believe work-hour restrictions can help to mitigate burnout, we find high rates of burnout in US general surgery residents, despite the majority of respondents adhering to work hour limitations. This suggests that attempts to address burnout should extend beyond the ACGME-mandated work-hour restrictions." One very interesting finding from the Elmore et al. study was in regard to other areas of social support. Specifically, they mentioned access to mentoring and/or one's feeling of being supported by administration as protective factors against attrition. Having access to these areas seem to provide a protective barrier to burnout. In fact, having a structured mentoring program was associated with lower burnout on each subscale of the MBI. Therefore, this is a good area for future study to determine if it is purely access to social support that provides psychological protectiveness against burnout or are there particular interventions within the mentoring process. Is it possible to address the effects of burnout in surgery with psychological interventions such as mindfulness, cognitive-behavior or stress management training?

Other areas of interest in the psychological domain can include environment, family/lifestyle factors, and age. As residents who intended to enter private practice or an alternative career (military surgery, nonsurgical clinical practice, or a nonclinical career) were more likely to meet the criterion for burnout than those who planned a career in academic medicine after training. This finding can also be observed in the American College of Surgeons study, finding that private practice surgeons were more likely to experience burnout and lower career satisfaction than surgeons practicing in academic settings [8]. In a study of residents in multiple specialties at Wayne State University, [18] where individuals without children had rates of burnout 1.5 times higher than those with children. Children might represent a marker for improved social support outside of the hospital training environment. Social support has been associated with

lower levels of work-related stress. [24] In addition to gender, age may be an area to study to help determine if higher age in residency put those individuals at a higher risk of burnout and possible attrition. Noted results have observed a greater likelihood of burnout with increasing age in general surgery trainees [10].

Finally, of these tests, the work done with Holland's theory appears to be of promise. Holland's most well-renowned work pertains to his theory (Holland, 1959, 1966b, 1973, 1985, 1997c) of vocational personalities and work environments. The theory's core idea is that most people resemble a combination of six personality types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (commonly abbreviated with the acronym RIASEC). Each type is characterized by a constellation of interests, preferred activities, beliefs, abilities, values, and characteristics [19]. Petrides and McManus employed Holland's theory in mapping medical careers in medical school applicant and final-year students. They used the empirical method of individual differences scaling to derive maps of the underlying perceived structure of medical career specialties, and to assess the extent to which those maps are similar to those described by Holland. Using Holland's theory, the identified medical specialties typical of Holland's six RIASEC categories. They were Surgery (Realistic), Hospital Medicine (Investigative), Psychiatry (Artistic), Public Health (Social), Administrative Medicine (Enterprising), and Laboratory Medicine (Conventional) (Petrides and McManus). They concluded a broad similarity between preferences for medical careers and the typology found by Holland in careers in general, suggesting that the structures are homologous. Because Holland's typology is underpinned by wide-ranging, broadly defined individual differences in aptitude and personality [17] these are also likely to be stable across time and cultures [3]. A limitation cited was the sample composition as it was restricted to medical students in the UK so another study conducted in the states could be beneficial to determine in the results would generalize to other populations.

Conclusion

Identifying factors that contribute to attrition has been challenging. We examined personality and environmental factors that can help to explain the problem of attrition. More importantly, this article explored how the use of psychological assessments and theory can be useful in helping identify appropriate candidates that could be successful in a surgical residency and thus have the potential to reduce attrition. There are already assessments such as the WOWI Online, the Five Factor Model, and the MBI that have been used with some success. The proposed application of Holland's theory of personality of vocational personalities to US medical students is especially promising as another way to assess likelihood of success as a surgical resident.

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