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The relationship between burnout, personality traits, and medical specialty. A national study among Dutch residents

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ABSTRACT

Purpose: To examine the associations between residents' personality traits, type of specialty, and symptoms of burnout.

Method: A cross-sectional online survey among Dutch residents was conducted (see [Supplementary Material](#)). The 20-item Dutch translation of the Maslach Burnout Inventory was used to ascertain burnout. Personality traits were assessed with the 44-item Dutch Big Five Inventory. Logistic regression analyses, including all five personality traits, were used to assess associations with burnout. Analyses were stratified by specialties.

Results: One thousand two hundred thirty one residents participated, 185 (15.0%) of whom met the criteria for burnout. Neuroticism was significantly associated with resident burnout in all specialties, more strongly in supportive (odds ratio (OR) 6.19, 95% CI 2.12–18.12) and surgical (OR 4.37, 95% CI 1.76–10.86) than in medical residents (OR 1.99, 95% CI 1.22–3.24). Extraversion was significantly associated with less burnout in surgical residents (OR 0.26, 95% CI 0.13–0.58). These findings remained highly significant after controlling for gender, overtime, autonomy at work, satisfaction between work and private life, and the perceived quality of the learning environment.

Conclusions: Burnout risk was associated with personality traits in residents. Consistently, residents scoring high on neuroticism reported more burnout. Extraverted surgical residents were less susceptible to burnout. Residents scoring high on neuroticism may require more intense monitoring during their training years.

Introduction

Residents in specialty training are at high risk of burnout. Studies worldwide have shown prevalence rates varying from 20 to 60% (Prins et al. 2010; Dyrbye and Shanafelt 2016). Burnout is defined as: 'a prolonged response to chronic emotional and interpersonal stressors on the job, described by three dimensions: emotional exhaustion, depersonalization and a low sense of personal accomplishment' (Maslach et al. 1996; Maslach et al. 2001). Burnout has a major impact on residents' personal and professional life: they encounter poor quality of life, poor mental health, less work productivity, and an increased risk of substance abuse, suicidal ideation, and medical errors (Maslach et al. 2001; Fahrenkopf et al. 2008; van der Heijden et al. 2008; Prins et al. 2009; West et al. 2009; West et al. 2011; Van Vendeloo et al. 2014; Dyrbye and Shanafelt 2016). Identification of factors contributing to the development of burnout may help in early recognition and development of preventive strategies.

The current understanding is that chronic stressors causing burnout arise from an imbalance between job demands and job resources, as being described in the job demands-resources model (Demerouti et al. 2001; Schaufeli and Bakker 2004). The quality of the learning environment has been shown to be a significant risk factor for burnout in residents (van Vendeloo et al. 2018). Individual

Practice points

- Residents suffering burnout experience far reaching consequences.
- Chronic stressors causing burnout arise from an imbalance between job demands and resources.
- The role of a resident' personality in burnout development is largely unknown.
- Resident's personality traits, in particular, neuroticism, are associated with burnout.
- Prevention programs for burnout in residents should consider screening for personality traits.

characteristics, like personality traits, are thought to play a smaller role when it comes to burnout risk (Dyrbye and Shanafelt 2016). However, personality traits affect the perception of job demands and resources, like workload, autonomy, and level of support, and may, therefore, be of interest (McManus et al. 2004; Dahlin and Runeson 2007; Prins et al. 2007). Personality is defined as a set of psychological traits and mechanisms within the individual that are relatively stable over time and that influence interaction with, and adaptations to, the environment (McCrae and Costa 1987; McCrae and John 1992).

Studies investigating the relationship between personality and burnout in a medical work environment are rare. A meta-analysis among employees, in general, found an association between the three dimensions of burnout and different personality traits, such as neuroticism, extraversion, conscientiousness, and agreeableness (Alarcon et al. 2009). It has been proposed that healthcare workers may have personality traits, which make them more susceptible to burnout (Gundersen 2001). High patient-care workload together with the emotional demanding aspects of the job might explain this. A prospective study among junior doctors from the United Kingdom showed weak, but significant correlations between personality and the dimensions of burnout. Those who scored low on extraversion or high on neuroticism suffered more from emotional exhaustion, and more agreeableness was associated with less depersonalization (McManus et al. 2004). A study among postgraduate first-year residents from Taiwan found a positive association between burnout and neuroticism. However, in their prediction model, only introversion and conscientiousness predicted burnout (Lue et al. 2010).

When analyzing the relationship between personality traits and burnout risk in residents, differences between residents from different specialties need to be taken into account. Firstly, burnout rates vary among different types of specialties. A large nationwide United States study found the highest prevalence of burnout in emergency medicine, general internal medicine, neurology, and family medicine physicians (Shanafelt et al. 2012). Secondly, distinctive differences in personality traits have been reported between specialties (Bexelius et al. 2016; Mullola et al. 2018). A recent study found solid and reproducible differences between surgical and medical specialties, with surgeons scoring higher on extraversion and openness to experience, but lower on neuroticism (Stienen et al. 2018).

The aim of our study was to examine the associations between residents' personality traits, type of specialty, and symptoms of burnout.

Methods

Design and subjects

We performed a nationwide cross-sectional study among Dutch residents (see [Supplementary Material](#)). In September 2015, a total of 7141 residents were registered by the national Dutch Registration Commission of Medical Specialties (Registratiecommissie Geneeskundige Specialisten, RGS) as being enrolled in one of the postgraduate medical training programs in the Netherlands, 2596 of whom (36.4%) were members of the Dutch Junior Doctor Association (De Jonge Specialist, DJS). All these 2596 members received an invitation by email on 21 September 2015 to participate in our study and complete an online self-report survey. Members of the association were encouraged to share the link for the survey with their fellow non-member residents. The study was exempt from ethical board review under Dutch law. Following ethical review guidelines for medical education research, participation was voluntary, all participants provided written informed consent and data were analyzed anonymously.

Measures

Demographic and occupational characteristics

The questionnaire included questions about gender, age, marital status, years in training, working hours, clinical setting (university medical center/affiliated general teaching hospital), overtime (weekly hours), autonomy at work and satisfaction with balance between work and private life (Likert scale: 1 = not satisfied to 6 = very satisfied). To assess the perceived quality of the learning environment, we used the three domain scores of the Scan of Postgraduate Educational Environment Domains (SPEED) (Schönrock-Adema et al. 2015).

Based on a previous study showing distinctive task differences between groups of residents, residents' specialties were aggregated into three subgroups: surgical (general surgery, cardiothoracic surgery, otorhinolaryngology, neurosurgery, ophthalmology, orthopedics, plastic surgery, urology, obstetrics and gynecology), medical (internal medicine, cardiology, dermatology, pediatrics, geriatrics, clinical genetics, pulmonology, gastroenterology, neurology, psychiatry, rheumatology, rehabilitation medicine, emergency medicine, sports medicine and hospital medicine) and supportive disciplines (anesthesiology, clinical chemistry, clinical physics, medical microbiology, nuclear medicine, pathology, radiology, radiotherapy, and clinical pharmacology). (Dijkstra et al. 2015).

Burnout

We used the validated Dutch translation of the Maslach Burnout Inventory (MBI-HHS) to assess burnout (Maslach et al. 1996). This "Utrecht Burn-Out Scale (UBOS-C)" was developed for use in people working in human services and health care (Schaufeli and Dierendonck 2001). UBOS-C consists of 20 items covering the three dimensions of burnout: emotional exhaustion (8 items), depersonalization (5 items), and personal accomplishment (7 items). Each item is scored on a 7-point Likert scale ranging from 0 (never) to 6 (every day). Mean scores were calculated for each dimension. Dutch cut-off scores, based on a reference group of 10,552 Dutch healthcare employees, were used to ascertain burnout (Schaufeli and Dierendonck 2001). Burnout was defined as either a mean score ≥ 2.50 on emotional exhaustion and ≥ 1.80 (men) or ≥ 1.60 (women) on depersonalization, or a mean score ≥ 2.50 on emotional exhaustion and a mean score of ≤ 3.70 on personal accomplishment (Schaufeli and Dierendonck 2001).

Personality

We used the Five-Factor Model to measure personality. This model comprises five traits: neuroticism, extraversion, conscientiousness, openness to experience, and agreeableness (McCrae and Costa 1987; McCrae and John 1992; Denissen et al. 2008). To assess these traits, the validated 44-item Dutch Big Five Inventory (BFI) questionnaire was used (Denissen et al. 2008). Each item is scored on a Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). There are subscales for neuroticism (8 items), extraversion (8 items), conscientiousness (9 items), openness (10 items), and agreeableness (9 items). Mean scores for each

trait were calculated (McCrae and Costa 1987; McCrae and John 1992; Denissen et al. 2008).

Statistical analyses

Data were analyzed using IBM SPSS Statistics for Windows, version 23 (IBM Corp., Armonk, NY, USA). To assess the representativeness of our study population, respondents' demographic characteristics were compared to those of the overall population of all Dutch specialty residents (7141 residents), at the time of the study (data supplied by the Royal Dutch Medical Association). Differences in demographic characteristics and personality traits between residents with and without burnout were assessed by independent *t*-test, chi-square, or Fisher exact test as appropriate. Pearson's correlation coefficient was used to determine the correlation between burnout dimensions and personality traits. Correlation coefficients <0.30 were considered weak, 0.30 – 0.50 moderately strong, and >0.50 strong. Analysis of variance (ANOVA) was used to examine differences in personality traits between the three types of specialties.

We used a multivariable logistic regression model to assess the associations between personality traits and burnout, adjusted for potential confounders. Confounding was tested for demographic characteristics associated with burnout. The multivariable logistic regression model was also performed separately for the three different groups of specialties. All analyses were pre-specified, effect modification by specialty and by gender was tested. To adjust for potential multiple testing bias, we used a Bonferroni correction model to determine significant *p*-value thresholds. As being described under the tables in the results section, the significance thresholds ranged between $p < 0.01$ and $p < 0.0015$, dependent on the number of analyses performed. For univariate analysis regarding demographic and occupational characteristics, a threshold of $p < 0.0015$ was used. Finally, for the analyses of effect modification, a more liberal threshold of $p < 0.05$ was used.

Results

A total of 1231 residents (906 females, 73.6%) completed the questionnaire: 309 (25.1%) from surgical, 654 (53.1%) from medical and 268 (21.8%) from supportive disciplines. 685 respondents (56% of all respondents) were DJS members. The 1231 respondents represented 17.2% of the total number of residents enrolled in postgraduate medical educational programs at the time the study was conducted. Due to our sampling strategy, an exact response rate could not be calculated. There were no statistically significant differences in age or specialty groups between respondents and the overall Dutch population of residents. Women were slightly overrepresented in our study population (73.6 vs. 64.2% in the overall Dutch population of residents, $p < 0.01$). Demographic and occupational characteristics of respondents are shown in Table 1.

A total of 185 (15.0%) residents met the criteria for burnout. Gender was not associated with burnout (15% in females vs. 15.1% in males). Age, marital status, hours worked, clinical setting and years in training were also not associated with burnout. Burnout prevalence was highest among surgical residents (18.1%), compared to residents

Table 1. Demographic characteristics for all residents.

Total	1231
Gender, <i>n</i> (%)	
Male	325 (26.4)
Female	906 (73.6)
Age, mean years (sd)	31.6 (3.64)
Marital status, <i>n</i> (%)	
Married or cohabiting	960 (78.0)
Single	257 (20.9)
Other	14 (1.1)
Years in training, <i>n</i> (%)	
1	218 (17.7)
2	252 (20.5)
3	275 (22.3)
4	218 (17.7)
5	179 (14.5)
6	73 (5.9)
7	5 (0.4)
Finished	11 (0.9)
Hours worked, <i>n</i> (%)	
Parttime (≤ 32 hrs)	126 (10.2)
Fulltime (> 32 hrs)	1105 (89.8)
Clinical setting, <i>n</i> (%)	
University medical center	540 (43.9)
General teaching hospital	540 (43.9)
Mental health clinic	76 (6.2)
Rehabilitation center	15 (1.2)
Other	60 (4.9)

from medical (15.4%) and supportive disciplines (10.4%), ($p = 0.03$). Residents who met the criteria for burnout reported working significantly more overtime (9.5 hours/week vs. 7.6 hours/week, $p < 0.001$), less autonomy at work ($p < 0.001$), and were significantly more dissatisfied with their balance between work and private life compared to residents without burnout (74.6 vs. 24.0%, $p < 0.001$). The perceived quality of the learning environment was significantly and inversely associated with burnout ($p < 0.001$). (van Vendeloo et al. 2018)

Correlation coefficients between the three dimensions of burnout and personality traits are presented in Table 2. Emotional exhaustion was strong and positively correlated with neuroticism and negatively correlated with extraversion. Depersonalization was positively correlated with neuroticism and negatively with agreeableness. The higher personal accomplishment was positively correlated with extraversion, agreeableness, conscientiousness, and negatively correlated with neuroticism. Between personality traits, a strong inverse correlation was found between neuroticism and extraversion.

Associations between personality traits and burnout, adjusted for gender, overtime, autonomy at work, satisfaction between work and private life, and the quality of the learning environment are shown in Table 3. There was significant effect modification of personality by specialty ($p < 0.05$). There was no effect modification for personality by gender. In all specialty residents disciplines, the degree of neuroticism was strongly associated with burnout, with odds ratios (OR) of 4.37 (95% CI 1.76–10.86) for surgical, 1.99 (95% CI 1.22–3.24) for medical, and 6.19 (95% CI 2.12–18.12) for supportive disciplines. In surgical residents, extraversion was strongly associated with less burnout (OR 0.26, 95% CI 0.13–0.58).

Discussion

Main findings

This study found that personality traits were associated with burnout risk. Neuroticism was the personality trait

Table 2. Correlation coefficients between burnout dimensions and personality traits.

	Mean (SD)	1	2	3	4	5	6	7
Burnout dimensions								
1. Emotional exhaustion	1.86 (1.00)							
2. Depersonalization	1.19 (0.82)	0.50*						
3. Personal accomplishment	4.48 (0.78)	-0.09*	-0.07					
Personality traits								
4. Openness to experience	3.41 (0.47)	0.06	0.05	0.10*				
5. Extraversion	3.57 (0.59)	-0.25*	-0.15*	0.25*	0.21*			
6. Neuroticism	2.51 (0.58)	0.53*	0.24*	-0.29*	-0.07	-0.38*		
7. Agreeableness	3.90 (0.41)	-0.11*	-0.28*	0.24*	0.06	0.05	-0.21*	
8. Conscientiousness	3.90 (0.46)	-0.11*	-0.19*	0.21*	0.06	0.16*	-0.22*	0.21*

* $p < 0.003$ (two-tailed) was considered significant. Burnout dimensions measured on scale UBOS-C, 0 = never to 6 = everyday. Scale Big Five personality traits 0 = strongly disagree to 5 = strongly agree.

Table 3. Multivariable logistic regression analysis assessing associations between personality traits and burnout after adjusting for work and learning environment.

	All specialties (N = 1231) Odds ratio (95% CI)	Surgical (N = 309) Odds ratio (95% CI)	Medical (N = 654) Odds ratio (95% CI)	Supportive (N = 268) Odds ratio (95% CI)
Openness	1.59 (1.06–2.97)	1.49 (0.59–3.76)	1.69 (1.02–2.80)	1.51 (0.54–4.27)
Extraversion	0.72 (0.52–1.00)	0.26* (0.13–0.58)	0.82 (0.53–1.27)	0.93 (0.42–2.01)
Neuroticism	2.34* (1.61–3.41)	4.37* (1.76–10.86)	1.99* (1.22–3.24)	6.19* (2.12–18.12)
Agreeableness	0.68 (0.44–1.05)	0.73 (0.26–2.04)	0.71 (0.40–1.26)	0.54 (0.17–1.69)
Conscientiousness	0.75 (0.50–1.12)	1.16 (0.49–2.71)	0.87 (0.49–1.53)	0.61 (0.20–1.85)

Analyses including all five personality traits and are adjusted for gender, overtime, autonomy at work, satisfaction between work and private life, and quality of the learning environment.

* $p < 0.01$ (two-tailed) was considered significant.

with the strongest association with burnout, among all residents. Only extraverted surgical residents were less susceptible to burnout. These findings remained highly significant after controlling for some well-known job demands and resources such as autonomy at work, satisfaction between work and private life, and the perceived quality of the learning environment. Our results suggest, contrary to the current opinion (Dyrbye and Shanafelt 2016), that the role of residents' personality as a risk factor for burnout development is being underestimated.

Comparison with previous studies and explanatory mechanisms

Neuroticism and extraversion

Our study is the first to find that the association between neuroticism and burnout applies to residents from surgical, medical, and supportive disciplines. This is in accordance with an earlier study among Dutch anesthesiologists, and with results of a meta-analysis among general employees from Taiwan (Lue et al. 2010; van der Wal et al. 2016). Although neuroticism was correlated with all burnout dimensions, the strongest correlation was found with emotional exhaustion. In line with the job demands-resources model, more neurotic people reported more job demands (Bakker et al. 2010). In this study, neuroticism significantly ($p < 0.001$) correlated with the perception of higher workload, less autonomy, less peer support, and less satisfaction between balance in work and private life. Persons scoring high on neuroticism suffer more from emotional instability, have lower levels of self-esteem, and experience higher levels of stress and anxiety (Barrick and Mount 1991; McManus et al. 2004). They tend to perceive stressful situations as threatening (Lue et al. 2010), and use problematic strategies like wishful thinking or withdrawal when coping with a problem (Watson and Hubbard 1996; Connor-Smith and Flachsbart 2007). These features help to explain why

residents scoring high on neuroticism are more susceptible to burnout. The differences in effect size for neuroticism and burnout between surgical, medical, and supportive disciplines (OR 4.37, OR 1.99, and OR 6.19) suggest that differences in job demands and resources between disciplines affect burnout risk. Further studies are needed to elucidate this.

Extraversion reflects the extent to which one is outgoing, cheerful, enthusiastic, and fun-loving (Costa and McCrae 1992). Extraverted persons incline to use problem-solving coping strategies (Watson and Hubbard 1996), and generally perceive their work environment more positively (Lau et al. 2006). They perform better in professions involving social interaction. These characteristics could make extraverted residents less prone to burnout. In this study, extraversion was only associated with less burnout among surgical residents. A comparable effect has been found previously in Dutch anesthesiologists (van der Wal et al. 2016). Extraversion may affect occupation wellbeing (e.g. burnout) through its influence on perceived workplace conditions (Hart et al. 1995; Judge et al. 2002; Bakker et al. 2010). Indirectly, extraversion could lead to experiencing more job resources (Bakker et al. 2010), and thus experiencing reduced job demands (Demerouti et al. 2001; Bakker and Demerouti 2008). In this study, extraverted surgical residents significantly perceived less workload and emotional stress compared with their extraverted colleagues in the medical and supportive group (data not shown). In addition, surgical residents reported working significantly more overtime than residents from supportive disciplines. These findings suggest that extraverted surgical residents perceive a more favorable working environment than their extraverted colleagues from medical and supportive disciplines. Further research is needed to confirm or refute our finding that residents who score high on neuroticism and low on extraversion could be at an increased risk of burnout, particularly in a surgical working environment.

Openness to experience, agreeableness, and conscientiousness

Openness is associated with being imaginative, independent thinking, curious, cultured, and broad-minded (Scheepers et al. 2014). The degree of openness was not associated with burnout in residents. Earlier studies conducted among medical and general employees found a similar effect (Piedmont 1993; McManus et al. 2004; Alarcon et al. 2009; Lue et al. 2010; Pejušković et al. 2011). Agreeableness and conscientiousness were also not associated with burnout. Previously, published research has shown contradictory findings on the association of agreeableness and conscientiousness with burnout (McManus et al. 2004; Alarcon et al. 2009; Lue et al. 2010; Pejušković et al. 2011; van der Wal et al. 2016). Conscientiousness is associated with persistence, dependability, and being organized, while agreeableness is related to cooperation, caring, and likeability (McCrae and John 1992).

Strengths and limitations

We used the complete UBOS-C to determine the rate of burnout while most previous studies on burnout in medical professions used abbreviated versions (Brenninkmeijer and van Yperen 2003). The national sample of 1231 residents makes the present study one of the largest performed to date. A limitation is that the recruitment strategy precludes calculation of a reliable response rate. More important, the study population was representative of the overall Dutch population of specialty residents in terms of age and specialty groups, but women were overrepresented in this study sample. Since female residents may be at a somewhat greater risk of burnout (Dyrbye and Shanafelt 2016), burnout prevalence rate may be overestimated. However, it is unlikely that this had a major impact on the main results, because we adjusted for gender in logistic regression analyses, and we found no gender-based effect modification. This study relied on self-reported data, which leaves the results vulnerable to common-method-variance and response bias, although some researchers questioned whether this is a serious problem (Spector 2006). Although it cannot be excluded that residents' distress and burnout affects their response to personality trait questionnaires, we are unaware of any studies examining this and personality traits are generally viewed as being relatively stable over time (Ferguson 2010; Lucas and Donnellan 2011). The cross-sectional study design precludes causal inference.

Implications

Our study provides further evidence that personality matters when it comes to burnout. Customized interventions could be developed based on a resident's personality and working environment, thus providing vulnerable residents with better coping strategies (Dyrbye et al. 2014). Residents' supervisors could be trained in early identification of a resident's personality related vulnerabilities. Longitudinal cohort studies are needed to further explore the relationship between the physician's personality, workplace conditions, and burnout development. Special attention should be paid to personality effects that vary depending on the type of specialty (e.g. extraversion).

Finally, we believe that more attention to residents' personality as a risk factor for burnout, together with improvements on an institutional level (e.g. improved learning environment) can help reduce and prevent burnout.

Conclusions

In this study, an association was found between burnout and residents' personality. Consistently, more neurotic residents were most affected by burnout. This suggests they may require more intense monitoring during their training years. Extraverted surgical residents seemed less susceptible for burnout. Possible effects of early recognition and support of residents at risk of burnout require further research.

Ethical approval

The study was exempt from ethical board review by the accredited Medical Research Ethics Committee. Following Dutch law and ethical review guidelines for medical education research, participation was voluntary, all participants provided written informed consent, and data were analyzed anonymously.

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Disclosure statement

All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and have nothing to declare. The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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Glossary

Burnout: Is defined as: "a prolonged response to chronic emotional and interpersonal stressors on the job, described by three dimensions: emotional exhaustion, depersonalization, and a low sense of personal accomplishment".

Personality: Is defined as a set of psychological traits and mechanisms within the individual. These characteristics are relatively stable and they influence how we interact and adapt to the environment.

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