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Job Autonomy and Burnout as Correlates of Psychological Morbidity and Work-related Stress: A Cross-sectional Study of NHS Consultants.

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Data Sharing Statement

Some data from this study will be used for publication in a second paper. The data evaluates early retirement due to stress and lack of autonomy in NHS consultants. The data is secured with Dr M. Islam (statistician).

Transparency Declaration Lead author (Dr Atir Khan) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

Abstract

OBJECTIVES This study aims first to examine the associations between job autonomy and burnout in relation to self-reported work-related stress and depression and anxiety symptoms; and then, to examine the current level of psychological morbidity among a sample of hospital consultants in the NHS.

DESIGN and SETTING A cross-sectional observational study in U.K. NHS hospitals.

PARTICIPANTS 593 NHS consultants (Male = 63.1%) from hospitals in England, Scotland and Wales.

PRIMARY OUTCOME MEASURES Self-reported online questionnaires on job autonomy (Job Demands-Resources Questionnaire), burnout (Maslach Burnout Inventory), depressive and anxiety symptoms (State Trait Personality Inventory), and work-related stress (Occupational Stress Indicator).

RESULTS Lack of job autonomy was a significant predictor of work-related stress (B=-2.61, 95% CI -2.99 to -2.22, p <·001), depressive (B=-0.28, 95% CI -0.41 -0.16, p <·001) and anxiety symptoms (B=0.16, 95% CI -0.27 to -0.04, p <·01). Burnout was observed to associate, with self-reported work-related stress (B=0.44, 95% CI 0.37 to 0.92, p<·001), and depressive (B=0.20, 95% CI 0.18 to 0.23, p<·001) and anxiety symptoms (B=0.18, 95% CI 0.16 to 0.19, p<·001). Results of this study observe high prevalence rates across all adverse health measures within this sample, namely: emotional exhaustion (38·7%), depersonalisation (13%), work-related stress (74·5%), anxiety symptoms (43·1%), and depressive symptoms (36·1%).

CONCLUSIONS This is the first study to observe low job autonomy and burnout to associate with psychological morbidity and work-related stress in a sample of NHS consultants. This study contributes to the building evidence, demonstrating the worryingly high occurrence of mental health issues and strain experienced by consultants working in the NHS. The findings highlight two potential avenues for targeted workplace intervention: improving consultants' job autonomy, and providing support and resources to prevent burnout. This study has implications for NHS policy makers and senior leadership.

STREGNTHS OF THIS STUDY

- This is the first study to contribute to the existing literature by demonstrating a link between lack of job autonomy and burnout on work-related stress, depressive symptoms, and anxiety symptoms among NHS consultants in England, Wales and Scotland.
- The study also provides a contemporary update on the current levels of burnout, work-related stress, anxiety symptoms and depressive symptoms in a sample of NHS consultants.
- Results of this study provide a basis to inform future organizational research in the NHS. Further studies will help to develop a picture of 'the psychosocial working environment' of today's NHS.
- The issues (e.g., "lack of job autonomy" and "burnout" in this study), identified from empirical data, should become targets of intervention and improvement measures.
- These findings could inform the discussions and decisions being made by NHS policy and decision makers. We expect that similar empirical studies in future will help to improve the NHS in future.

LIMITATIONS OF THIS STUDY

- This is a cross-sectional study design.
- As such, any interpretation of causality is not appropriate, as it is plausible that the relationship between job autonomy, burnout, depressive and anxiety symptoms, and work-related stress may be reciprocal in nature.
- All study variables were drawn from self-report data of the individual consultant, making it vulnerable to common method bias.
- Care needs to be taken in generalizing any findings to the wider profession or sector.

Introduction

In United Kingdom, 27% to 32% of NHS consultants have been reported to have high levels of psychiatric morbidity and burnout[1,2]. More recent reviews have reported similar depression[3] and burnout[4] rates among doctors in general. Doctor's mental health has been linked with patient safety[5] and turnover intentions[6], making it imperative to study the antecedents of psychological morbidities. Such knowledge can inform the development of targeted evidence-based workplace interventions. Research in this area has remained predominately focused on demanding aspects (e.g., working hours, perceived workload) of the working environment as predictors of doctors' psychological morbidity[5,7]. We aim to extend this literature by testing the role of job autonomy and burnout as antecedents of work-related stress, depression and anxiety.

Qualitative research has observed that NHS consultants feel an erosion of their work-related autonomy, particularly in relation to the organisation and management of their work[10]. This is concerning because job autonomy is the cornerstone of several work motivational[11,12] and occupational stress theories[16]. Job autonomy provides workers with the discretion, independence, and freedom to make decisions, to arrange tasks, and to select the best methods and procedures at work[11]. Such skill discretion makes work meaningful, and provides flexibility to select and pursue important work goals[13]. Empirical evidence supports these theoretical assumptions, with meta-analyses observing high job autonomy to predict job satisfaction, intrinsic motivation, growth satisfaction, organizational commitment, decreased turnover intention, and enhanced job performance[13,14]. Conversely, within the general working population, evidence indicates low job autonomy to significantly predict psychological morbidity[8,15] and stress-related disorders[17]. We are not aware, however, of any attempts to test the relationships between job autonomy and

psychological morbidity amongst the NHS consultants. This clear gap in knowledge will be addressed by the current study.

Much of the research in psychological morbidity has examined how it is predicted by intra-individual factors[5] (personality and demographics). More recently, burnout has been postulated to operate as an antecedent to more serious mental health conditions (e.g., depression and anxiety)[9]. Burnout is defined as a syndrome of three dimensions[22]: emotional exhaustion, depersonalisation, and reduced personal accomplishment. Emotional exhaustion denotes being emotionally overextended and exhausted by work; depersonalisation refers to an impersonal feeling towards people; and reduced personal accomplishment encompasses the reduced work effectiveness due to emotional exhaustion and depersonalisation. Understanding this relationship is crucial due to the reported high prevalence rates of burnout amongst the doctors[3,4], which appear to be increasing[2,18]. Although, burnout and work-related stress have been previously observed to frequently occur among UK doctors[19]; previous research has not, however, examined the association between burnout and self-reported depression and anxiety symptoms within this working population. Such information would yield greater understanding of the psychosocial factors linked with the psychological morbidity in UK consultants.

Aims and Hypotheses

The aims of the study were twofold. Firstly, to examine the associations between job autonomy and burnout in relation to self-reported work-related stress and depression and anxiety symptoms; and, secondly, to examine the current level of psychological morbidity among a sample of hospital consultants in the NHS. The study hypothesizes that: (i) low job autonomy will negatively predict consultants' self-reported work-related stress, depressive and anxiety

symptoms; and (ii) burnout will positively predict consultants' self-reported work-related stress, depressive and anxiety symptoms.

Methods

Study design, setting and population

A cross-sectional quantitative survey was carried out between November and December 2015. A simple random sample of 500 was calculated allowing 5% absolute error in the work related stress (one main outcome measure) and considering it as a standard normal variate. This also corresponds with the existing literature in similar areas (e.g., Agius et al.[20]). Questionnaires were sent to the consultants through human resource departments of relevant Trusts and Health Boards of all the three countries: England, Wales and Scotland. The invited consultants took part in the survey, conducted by an electronic survey tool, Bristol on-line[i]. To minimize the respondent bias, the research team (including the principle investigator) were blind about the responding consultants and vice versa. The study received ethical approval from Birkbeck University of London.

In total, 593 responses were completed online. A full demographical breakdown is presented in Table 1. The sample was evenly split between England (32.5%), Wales (32%) and Scotland (35.4%). The majority of respondents were male (63.1%), and aged between 41-50 years (45.5%) and 51-60 years (31%). In total, eight speciality groups were represented, with the majority of respondents identifying as physicians (28.8%), surgeons (18.2%), anaesthesiologists (14%) and others' (15.7%).

[i] www.survey.bris.ac.uk

Measures

Surveyed consultants provided information on socio-demographic details, job autonomy, burnout, work-related stress, and anxiety and depressive symptoms. Internal reliability statistics are reported in Table 2.

- Job autonomy was measured using three items from the Job Demands-Resources Questionnaire[21]. These (e.g., "do you have flexibility in the execution of your job?") were rated on a five-point Likert scale, with high scores representing more autonomy.

- The Maslach Burnout Inventory[22] measured burnout. Although burnout contains three dimensions, only fourteen items from the first two dimensions of burnout (emotional exhaustion & depersonalisation) were used in this study. This is in line with previous research, advocating these as the core dimensions of burnout and the most effective way of scoring burnout[4]. These included items such as "I feel frustrated by my job" rated on a seven-point Likert scale, with high scores indicative of high burn-out. Emotional exhaustion refers to feeling emotionally overextended and exhausted by work, while depersonalisation denotes an impersonal feeling towards people. In line with the manual guidelines and past research[1,2], cut-off scores from norm scores of health professionals were used to identify the proportion of consultants who scored highly on the two burnout dimensions. Aggregated scores of both dimensions were used for hypotheses testing.

- Depressive and anxiety symptoms were measured by the State Trait Personality Inventory[23]. The frequency of each item (e.g., "I feel depressed") was rated on a four-point Likert scale with high scores representing greater experience of anxiety and depressive symptoms. Although neither measure has clinically diagnostic cut-off points,

consultants in this study with scores higher than the 75th percentile of UK working norm scores were classed as high scoring.

- The 22-items from the Occupational Stress Indicator[25] measured work-related stress. Respondents rated how satisfied they were with the items provided (e.g., "the level of job security in your present job") on a six-point scale, with high scores representing more work-related stress. Consultants with who scored above the 75th percentile against the UK working norm were classed as experiencing high stress.

Statistical analysis

Exploratory data analysis of demographic characteristics of consultants and constructs measured was performed. We used non-parametric Spearman's rank correlation to explore the relationship between individual measures. We checked the reliability of all measurement scales comprising multiple Likert questions by assessing internal consistency through Cronbach's alpha. Three Multiple Linear Regression Models (MLR1, MLR2 & MLR3) estimated the effect of job autonomy and burnout onto work-related stress, anxiety and depressive symptoms. All these were adjusted by socio-demographic characteristics of the consultants. Assumptions underlying multiple regressions were checked by plotting residual errors and standardised residuals. Existence of multicollinearity was checked through variance inflation factors, and Durbin-Watson tests were conducted for correlated residuals. All these diagnostics fell within the acceptable ranges for each multiple linear regression model. SPSS (version 22) was used for data management and statistical analysis. Missing data was examined; with, in general, low levels observed (i.e., 1.9% in gender and 0.7% for consultant specialty). Such data was excluded from the analysis due their non-significant size. The paper is reported in accordance with the STROBE statement[24].

Results

Psychological morbidity

Table 1 displays the characteristics of the participating consultants and indicates that 38·7% of consultants were classed as emotionally exhausted, while 13% had high depersonalisation. For work-related stress, 74·5% of consultants experienced high stress, while 43·1% and 36·1% of consultants reported anxiety and depressive symptoms respectively.

Table 1 also presents the prevalence of psychological morbidity across different demographics within this given sample. A higher percentage of male consultants experienced high depersonalisation and depression, whereas female consultants experienced a higher percentage of depersonalisation, anxiety and work-related stress. Across the three countries psychological morbidity was similar. Although Wales had more consultants experiencing emotional exhaustion, but had the fewest proportion of consultants with high levels of anxiety. Consultants aged 31-40 and 51-60 years had the poorest reported mental wellbeing, while those over the age of 60 had the best. In terms of specialty, pathology/ microbiology stands out with the highest prevalence on three of the five adverse health measures: emotional exhaustion, anxiety and depression.

Table 1: Characteristics of participating consultants

Characteristics	N (%[a])	Burnout Dimensions				
		Emotional Exhaustion	Depersonalisation	Work-related stress	Anxiety symptoms	Depressive symptoms
Study cohort:						
Substantive consultant	593 (100 %)	38·70%	13·00%	74·50%	43·10%	36·10%
Countries:						
England	193 (32·5%)	37·82%	12·95%	74·61%	52·13%	43·09%
Wales	190 (32·0%)	40·53%	12·63%	75·26%	41·94%	38·17%
Scotland	210 (35·4%)	37·91%	13·74%	73·93%	51·92%	36·54%
Gender:						
Male	374 (63·1 %)	37·43%	13·90%	72·99%	47·33%	41·98%
Female	208 (35·1 %)	41·35%	12·02%	77·40%	51·44%	31·25%
Missing	11 (1·9 %)					
Age:						
30 - 40 years	119 (20·1 %)	41·18%	16·67%	80·99%	50·83%	37·50%
41 - 50 years	267 (45·5 %)	35·58%	12·36%	74·16%	47·49%	40·15%
51 - 60 years	184 (31·0 %)	42·93%	13·04%	71·74%	52·22%	37·78%
>60 years	23 (3·9 %)	26·09%	0·00%	60·87%	28·00%	24·00%
Speciality:						
Physician	171 (28·8%)	33·33%	14·04%	71·35%	47·88%	35·15%
Surgeon	108 (18·2%)	43·52%	15·74%	69·44%	48·54%	45·63%
Obstetrics/Gynaecology	24 (4·0%)	37·50%	12·50%	75·00%	41·67%	25·00%
Anaesthesia	83 (14·0%)	28·92%	13·25%	84·34%	47·56%	40·24%
Radiology	41 (6·9%)	36·59%	12·20%	78·05%	46·34%	36·59%
Psychiatry	47 (7·9%)	46·81%	8·51%	80·85%	52·08%	37·50%
Pathology/Microbiology	22 (3·7%)	59·09%	9·09%	72·73%	72·73%	54·55%
Other	93 (15·7%)	44·09%	12·90%	73·12%	47·31%	34·41%
Missing	4 (0·7%)					

[a]*After excluding missing values*

Internal reliability and correlations between job autonomy and psychological morbidity

All the measurements achieved very good reliability and excellent internal consistency as Cronbach's alpha for almost all of them are approximately 0·9. The non-parametric correlation

coefficients between all five measurements, age and work experience of the consultants are displayed in Table 2. Nearly all relationships have statistically significant correlations. Job autonomy was statistically significantly correlated with work-related stress, burn-out, anxiety, and depression symptoms. Moderate but significant correlation also existed for burnout with anxiety (ρ=0·57), depression (ρ=-0·59) and work-related stress (ρ=-0·49). All three outcome measures were also strongly correlated with each other, more specifically, between: anxiety and depression (ρ=0·79), work-related stress and depression (ρ=0·54), and work-related stress and anxiety (ρ=0·44).

Table 2: Internal reliability and correlations between the study variables

Variable	Internal reliability (Cronbach's α)	Job autonomy	Burnout	Work-related stress	Anxiety	Depression	Tenure	Age
Job autonomy	.885	5·83 (3·04)						
Burnout	.919	-0·22**	54·59 (15·65)					
Work-related stress	.938	-0·53**	0·49**	56·66 (17·52)				
Anxiety	.836	-0·23**	0·57**	0·44**	21·35 (4·91)			
Depression	.902	-0·31**	0·59**	0·54**	0·79**	20·94 (5·43)		
Tenure	-	-0·09*	-0·02	-0·08*	0·10*	0·04	11·27 (7·29)	
Age	-	0·009**	0·02	-0·13**	0·04	-0·03	0·86**	47·63 (7·47)

Note· Mean (SD) are reported diagonally; **· *p<.01 level (1-tailed).* *. *p<.05 level (1-tailed).*

Consultants' work-related stress

Multiple Linear Regression Model 1 (Table 3) examined whether job autonomy and burnout, adjusted for consultant specialty, country and the demographic variables, were significant predictors of sampled consultants' work-related stress. R^2 for the predictor model was ·46 (adjusted R^2=·45). Results show that job autonomy, burnout, gender and consultant type (anaesthetists; pathology) significantly predicated work-related stress.

Table 3: Results for the MLR1 on Work-related Stress

Predictor	Coefficients (B)	Standardised coefficient (β)	Sig.	95·0% Confidence Interval for B	
				Lower Bound	Upper Bound
(Constant)	63·41		·001	51·78	75·04
Job autonomy	-2·61	-0.45	·001	-2·99	-2·22
Burnout	0·44	0.40	·001	·37	0·52
Specialty					
Pathology or Microbiology	-6·42	-0.07	0·04	-12·45	-0·39
Surgery	-0·37	0.01	0·83	-3·62	2·89
Anaesthesia	3·84	0.08	0·03	0·36	7·32
Radiology	0·50	0.01	0·83	-4·01	5·02
Psychiatry	-1·86	-0.03	0·39	-6·18	2·45
Other	0·50	0.01	0·77	-2·83	3·82
Obstetrics/Gynaecology	0·65	0.01	0·82	-4·98	6·29
Physician (ref)					
Age	-0·30	-0.13	0·05	-0·61	·000
Gender (male)	-2·72	-0.08	0·02	-5·07	-0·37
Work experience (years)	0·05	0.02	0·76	-0·26	·358
Country					
Wales	-1·31	-0.04	0·36	-3·93	1·30
England	-0·24	-0.01	0·86	-2·91	2·44
Scotland (ref)					

Note: Dependent variable is work-related stress

One-unit increase in autonomy score corresponded with a decrease of 2·61 (p<·001) on the work-related stress score. Similarly, one-unit increase in burnout was associated with an increase of 0·44 (p<·001) in work-related stress. As seen in Table 3, males have an average stress score that is lower (B=-1·31; p<·02) than females. Compared against Physicians, Anaesthetists (B=3·84) had higher mean scores on work-related stress, and Pathology consultants had lower (B=-6·42) mean scores on work-related stress.

Consultants' anxiety symptoms

Multiple Linear Regression Model 2 (Table 4) observed job autonomy, and burnout to predict consultants' anxiety levels, when adjusted for consultants' specialty, country of work and the demographic variables (R^2=·40 and adjusted R^2=·38). More specifically a one-unit increase in job autonomy corresponded with a decrease of 0·16 (p<·05) on consultants' anxiety score. Similarly, a one-unit increase in burnout corresponded with a 0·18 (p<·01) increase in anxiety.

Table 4: Results for the MLR2 on anxiety

Predictor	Coefficients (B)	Standardised coefficient (β)	Sig.	95·0% Confidence Interval for B	
				Lower Bound	Upper Bound
(Constant)	17·28		·001	13·81	20·736
Job autonomy	-·16	-0.09	·008	-·27	-·040
Burnout	·18	0.57	·001	·16	·19
Specialty					
Pathology or Microbiology	-·84	-0.03	·360	-2·63	·96
Surgery	·84	0.07	·088	-·13	1·81
Anaesthesia	·36	0.03	·491	-·67	1·40
Radiology	-·44	-0.02	·517	-1·79	·90
Psychiatry	-·34	-0.02	·603	-1·63	·94
Other	·72	0.06	·151	-·26	1·71
Obstetrics/Gynaecology	1·70	0.07	·047	·03	3·38
Physician (ref)					
Age	-·17	-0.26	·001	-·26	-·08
Gender (male)	1·23	0.12	·001	·53	1·93
Work experience (years)	·19	0.28	·001	·09	·28
Country					
Wales	·81	0.08	·041	·04	1·59
England	·28	0.03	·498	-·52	1·07
Scotland (ref)					

Note: Dependent variable is anxiety symptoms

In terms of demographics, with one-unit (i.e., year) increase in age, consultants' anxiety score decreased by 0·17 (p<·01). Males had, on average, an anxiety score that was 1·23 times higher than female. More experience was associated with higher anxiety (B=0·19, p<·001). Similarly, consultants from Wales had more anxiety symptoms than compared consultants from Scotland (B=0·81; p<·05). Obstetrics & Gynaecology consultants reported more anxiety symptoms than Physicians.

Consultants' depressive symptoms

Multiple Linear Regression Model 3 (Table 5) found job autonomy, burnout, specialty of Obstetrics & Gynaecology, age, work experience, and country of work significantly predicted the level of consultants' depressive symptoms (R^2=·43; adjusted R^2=·42).

Table 5: Results for MLR 3 on depressive symptoms

Predictor	Coefficients (B)	Standardised coefficient (β)	Sig.	95·0% Confidence Interval for B	
				Lower Bound	Upper Bound
(Constant)	18·66		·001	14·94	22·38
Job autonomy Score	-·28	-1.58	·001	-·41	-·16
Burnout Score	·20	0.59	·001	·18	·23
Specialty					
Pathology or Microbiology	-·81	-0.3	·411	-2·74	1·12
Surgery	·67	0.05	·206	-·37	1·71
Anaesthesia	-·21	-0.01	·710	-1·32	·90
Radiology	-·63	-0.03	·394	-2·07	·82
Psychiatry	·06	0.00	·927	-1·32	1·44
Other	·43	0.03	·430	-·64	1·49
Obstetrics/Gynaecology	1·78	0.07	·053	-·03	3·58
Physician (ref)					
Age	-·21	-0.29	·001	-·31	-·11
Gender (male)	·09	0.01	·807	-·66	·85
Work experience (years)	·20	0.27	·001	·11	·30
Country					
Wales	·74	0.43	·081	-·09	1·58
England	·10	0.44	·824	-·76	·95
Scotland (ref)					

Note: Dependent variable is depressive symptoms

For the significant predictors (refer to Table 5), lack of job autonomy negatively predicted the level of depressive symptoms (B=0·28, p<·001). One-unit increase on burnout was associated with an increase of 0·20 in the number of depressive symptoms reported. Consultants working in Obstetrics & Gynaecology reported more depressive symptoms (B=1·78, p<·10) than Physicians. In terms of age, each increase in year was associated with 0·21 (p<·01) fewer depressive symptoms reported. Experience was also associated with more depressive symptoms (B=0·20, p<·01).

Discussion

This study aimed to examine the link between job autonomy and burnout with work-related stress, depression and anxiety symptoms. The analyses found that both study hypotheses were supported, indicating that job autonomy and burnout were associated with the three adverse health outcomes. Furthermore, examination of the prevalence rates of burnout, work-related

stress, depressive symptoms and anxiety symptoms reveal that our study of UK consultants observed a higher prevalence rates than those observed by previous studies[1,2,26,27]. While the nature of the study design does not allow for causal explanations and is convenience sample, the current study provides a useful snapshot of the current state of psychological morbidity among the UK consultants and helps to fulfil some of the existing gaps in the current literature on consultants' psychological morbidity.

These results provide additional evidence of the importance of work-related factors, by highlighting their significance due to their association with psychological morbidity. Importantly, these health outcomes are not accounted for merely by social and demographic factors[4,5]. The finding that high job autonomy is associated with lower work-related stress, and fewer anxiety and depressive symptoms, is congruent with the theoretical propositions advocating its beneficial motivational[11,12] and health enhancing[16] properties. Moreover, enhancing job autonomy allows doctors the freedom to pursue more meaningful tasks and more efficient ways of working, both of which have been postulated to lead to improved worker health[13,14] and patient care[31]. This is consistent with the empirical evidence drawn from more general samples demonstrating a beneficial link between job autonomy with performance, motivational and health outcomes[13,14,15,17].

Another important contribution of this study lies in the observation that, within this surveyed sample of consultants, burnout was significantly associated with psychological morbidity. This is concerning in the light of the high prevalence of burnout among UK consultants; highlighted in this study, and in past related studies[3,4]. With more serious measures of psychological morbidity (such as anxiety and depression) being a possible consequence of burnout, targeted interventions preventing or mitigating such issues should be viewed as a clear

organizational priority within the NHS. This is congruent with the evidence[30] that comprehensive interventions, simultaneously targeting organisational, material and work-time related conditions may be more beneficial to worker health than interventions only targeting the individual. Even if causality may not be established in this study, longitudinal evidence from elsewhere supports burnout's role as an antecedent to psychological morbidity[9].

Limitations

A number of limitations exist within the context of this study that need to be acknowledged when reviewing the study results. First, it is a cross-sectional study design. As such, any interpretation of causality is not appropriate, as it is plausible that the relationship between job autonomy, burnout, depressive and anxiety symptoms, and work-related stress may be reciprocal in nature[19]. For example, McManus and colleagues[29] found that lack of support and workload among doctors was predicted by burnout levels from six years earlier. This lends credibility to the argument that doctors with burnout, or psychological morbidity in general, may in turn perceive more difficult working conditions. The second limitation recognises that all study variables were drawn from self-report data of the individual consultant, making it vulnerable to common method bias; but, at the same time, this is an established method in quantitative research. Third, although the study sample size is guided by similar studies in the past[20], the sample size is smaller than that of past research into the prevalence of psychological morbidity amongst UK consultants[1,2]. Therefore, care needs to be taken in generalizing any findings to the wider profession or sector. Finally, although qualitative research has already suggested that consultants feel a reduction in job autonomy[10]; precise information on the existing quantitative levels of job autonomy among UK consultants remains unknown.

Implications and conclusions

Considering the research suggesting an erosion of job autonomy among consultants in the current NHS environment[10], results of this study suggest a significant negative association between this work characteristic, and increased levels of depressive and anxiety symptoms and work-related stress. This observation merits substantive consideration and, in turn, action at policy and practice levels within the NHS. If burnout among consultants is associated with depression or anxiety, this can have serious ramifications on their ability to recover and continue as an effective part of the workforce. This problem, therefore, should be viewed as a key organizational issue by the NHS. This should create an impetus for the government, healthcare leaders and other appropriate decision makers to consider how future organizational decisions in the NHS may further impact on consultants' job autonomy; and how it can be improved. Consistent results in the wider literature have already demonstrated that low job autonomy predicts poorer performance[13,14], but the results here demonstrate a significant association to consultants' self-reported psychological morbidity.

Similarly, for the first time, this study provides empirical support that burnout is significantly associated with consultants' psychological morbidity. This study yields important new evidence of the health-supporting role of job autonomy and predicative association of burnout to psychological morbidity within a sample of NHS consultants. These findings strongly highlight the value of workplace health interventions targeted at adapting working conditions and proactively managing burnout among the NHS staff. Ultimately, interventions to address job autonomy and burnout among consultants are important, not only for the NHS' ability to provide safe and high quality care[5]; but to maintain and retain a healthy and high performing workforce[6].

Other Information

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Contributors

ASAK and JH were responsible for the study concept and design. ASAK and KT drafted the first version of the report. KT was responsible for the literature search. KT also provided critical revision of the manuscript as it went through the revision process, and agreed to submit the report for publication. MSI did the data management and statistical analyses. All authors contributed to the content and critical revision of the report, and agreed to submit the report for publication.

Declaration of interests

We have no competing interests to declare.

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STROBE Checklist for: "*Job Autonomy and Burnout as Correlates of Psychological Morbidity and Work-related Stress: A Cross-sectional Study of NHS Consultants*".

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation	Location
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	In title the term "cross-sectional" is included
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	Abstract based on the journal's structure is included
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Pg. 2 of the manuscript, paragraph 1.
Objectives	3	State specific objectives, including any pre-specified hypotheses	Pg. 2 under "Aims and Hypotheses"
Methods			
Study design	4	Present key elements of study design early in the paper	Pg. 3 under "study design, setting and population"
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Pg. 3 under "study design, setting and population"
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	Pg. 3 under "study design, setting and population"
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Variables are introduced in the Introduction
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Pg. 3 under "Measures"
Bias	9	Describe any efforts to address potential sources of bias	Pg. 7 (under study design, setting and population)
Study size	10	Explain how the study size was arrived at	Pg. 3 under "study design, setting and population"
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Pg. 5 under "Statistical analysis"

Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	Pg. 5 under "Statistical analysis"
		(*b*) Describe any methods used to examine subgroups and interactions	Not applicable
		(*c*) Explain how missing data were addressed	Pg 5 under "Statistical analysis"
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	Pg. 7 (under study design, setting and population)
		(*e*) Describe any sensitivity analyses	Not applicable
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Pg. 3 under "study design, setting and population"
		(b) Give reasons for non-participation at each stage	Not applicable
		(c) Consider use of a flow diagram	Not applicable
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 1
		(b) Indicate number of participants with missing data for each variable of interest	Table 1
Outcome data	15*	Report numbers of outcome events or summary measures	Table 2
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Tables 2-5
		(*b*) Report category boundaries when continuous variables were categorized	Not applicable
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not applicable
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Tables 2-5
Discussion			
Key results	18	Summarise key results with reference to study objectives	Pg. 11, first paragraph of discussion
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Pg. 13 under "limitations"
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Discussion section
Generalisability	21	Discuss the generalisability (external validity) of the study results	Pg. 14 under "Implications and

			conclusions”
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Not applicable

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Psychosocial Work Characteristics, Burnout, Psychological Morbidity Symptoms and Early Retirement Intentions: A Cross-sectional Study of NHS Consultants in the United Kingdom.

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Psychosocial Work Characteristics, Burnout, Psychological Morbidity Symptoms and Early Retirement Intentions: A Cross-sectional Study of NHS Consultants in the United Kingdom.

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Data Sharing Statement

Individual participant data collected under this study were deidentified which are reported in the form of tables. The original proposal of the study will be available upon request. Deidentified data will be shared for non-commercial research purpose given the consent of the lead author after the publications as per guidelines of the BMJ Open.

Transparency Declaration Lead author (Dr Atir Khan) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

Abstract

OBJECTIVES The objectives of this study are twofold. First, to examine the direct effect of psychosocial work characteristics (as measured by job autonomy and work-related pressure) in relation to self-reported psychological morbidity symptoms and early retirement retentions among a sample of hospital consultants in the National Health Service (NHS). Second, to investigate burnout as mediating variable (i.e., indirect effect) of these postulated associations.

DESIGN and SETTING A cross-sectional observational study.

PARTICIPANTS 593 NHS consultants (Male = 63.1%) from hospitals in England, Scotland and Wales.

MEASURES Self-reported online questionnaires on work-related pressure and job autonomy (Job Demands-Resources Questionnaire); emotional exhaustion and depersonalisation (Maslach Burnout Inventory); depressive and anxiety symptoms (State Trait Personality Inventory); and a single-item on early retirement intention.

RESULTS Multiple linear regressions examined direct effects, with indirect effects examined using Hayes' PROCESS macro. Job autonomy negatively predicted the frequency of NHS consultants' anxiety and depressive symptoms, and their intention to retire early. No direct relationships involving work-related pressure were observed. Both emotional exhaustion and depersonalisation mediated the relationships that work-related pressure and job autonomy had with symptoms of psychological morbidities. Only emotional exhaustion mediated the relationships where early retirement intention was the outcome. Results of this study observed high prevalence rates across all adverse health measures within this sample, namely: emotional exhaustion (38.7%), depersonalisation (13%), anxiety symptoms (43.1%), and depressive symptoms (36.1%).

CONCLUSIONS This is the first study to observe job autonomy to associate with the number of psychological morbidity symptoms and early retirement intention in a sample of NHS consultants. Burnout dimensions mediated these relationships, indicating that interventions need to focus on enhancing working conditions and addressing burnout among NHS consultants before more severe symptoms of psychological morbidity are reported. This study has implications for NHS policy makers and senior leadership.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This is the first study to demonstrate the mediating role of burnout between psychosocial work characteristics of NHS consultants and their reported depressive and anxiety symptoms and intentions to seek early retirement.
- A substantive proportion of surveyed NHS consultants reported experiencing: emotion exhaustion, pervasive feelings of cynicisms regarding work, and excessive anxiety and depression symptoms.
- Mediations were examined using Hayes' PROCESS Model 4 macro with bootstrapping, which generates more accurate confidence intervals than other more commonly used mediation methods. This is a cross-sectional study design. As such, any interpretation of causality is not appropriate, as it is plausible that the relationship between the variables measured are reciprocal in nature.
- All study variables were drawn from self-report data of the individual consultant, making it vulnerable to common method bias.
- We were not able determine the response rate as we are unaware as to how many NHS trusts and health boards who agreed to participate actually followed through and sent the survey link to their consultants.

Introduction

The National Health Service (NHS) is one of the world's largest employers, with 1.3 million staff in England and Wales caring for an estimated 243 million patients annually[1]. For this system to continue to provide safe, sustainable and patient-centred care the wellbeing and retention of its workforce are critical considerations. The NHS performs comparatively worse across many measures of staff wellbeing; with sickness absence rates, on average, 27% higher than the UK public sector and 46% higher across all sectors[2]. Understanding the nature and impact of psychosocial working conditions on medical professionals' work-related wellbeing is, we believe, of clear empirical importance. In addition, its practical value in the development of evidenced-based workplace preventative solutions cannot be understated.

Psychosocial work characteristics and work-related wellbeing

Exposure to poor psychosocial work characteristics (e.g., poor job autonomy, work-related pressures, injustice at work, insufficient leadership) have been linked to a myriad of work-related wellbeing (inclusive of physical, psychological, behavioural and attitudinal) outcomes, including for example: poor mental health[3,4]; increased health impairing behaviours (e.g., increased smoking[5], alcohol consumption[6]); poor physical health (e.g., coronary heart disease[7,8]; reduced job satisfaction[9]; intention to quit[10]; and diminished organisational commitment[11]. In short, there is strong research to suggest that exposure to poor psychosocial work characteristics poses a clear risk to employees' health and work engagement[12]. However, the nature and mechanisms underpinning such associations must be examined and understood at various levels (e.g., community, sectoral, and organisational), and within various vocational groups and occupational roles.

Within the healthcare sector, much of the available research has focused on a limited number of occupational groups (e.g., nurses[13,14]; social workers[15,16]; and, to a lesser degree,

doctors[17,18]. While the extant literature examining doctors specifically is increasing, there has (to date) been little attempt to examine the nature of this association within a unique vocational subgroup: NHS hospital consultants. These doctors are among the most experienced and trained within this vocational group[19]. Their role as educators and supervisors of the next generation of doctors and nurses means their organisational contribution in the development of the current and future healthcare workforce is imperative[20].

The Mediating Role of Burnout

Burnout is one of the most commonly studied wellbeing constructs within the healthcare sector[21]; and, in particular, as a measure of work-related wellbeing among doctors. Burnout refers to a prolonged psychological response to chronic emotional and interpersonal stresses related to work[22,23], and manifests through symptoms of emotional exhaustion, depersonalisation and reduced personal accomplishment. *Emotional exhaustion* denotes being emotionally overextended and exhausted by work. *Depersonalisation* refers to an impersonal feeling towards people, and reduced *personal accomplishment* encompasses the reduced work effectiveness due to emotional exhaustion and depersonalisation. Studies[21,24,25] have found strong and consistent support for the emotional exhaustion and depersonalisation dimensional factors of burnout; and are, therefore, typically viewed as its' core conceptual components. However, the evidence surrounding professional accomplishment is comparatively mixed. Consequently, personal accomplishment is generally viewed as a separate, but related entity[24].

Evidence derived from reviews and meta-analyses demonstrate a significant association between poor psychosocial working conditions and doctors' self-reported burnout symptoms[17,18]. Within the extant literature, burnout has predominantly been conceptualised

and investigated as the outcome of a poor psychosocial work environment. However, there is increasing attention being paid to the potential role of burnout as an antecedent to a range of health-related, attitudinal and behavioural outcomes, including: depression and anxiety[26], substance abuse[27], work performance[28], turnover intention[29] and patient care[30]. This is not surprising, as burnout depletes workers' energy and coping resources, which may results in increased physiological and psychological strain[31]. This may, in turn, trigger and exacerbate symptoms of psychological morbidity and work disengagement; and, consequently in the long term, interfere with performance[32]. Despite this, to date limited research has sought to examine burnout as a possible mediating variable in relation to doctors' perceived working condition and their psychological health and experienced work-related attitudes. This study aims to address this gap in knowledge.

Study Aim

The objectives of this study are twofold. Firstly, to examine the direct effect of psychosocial work characteristics (job autonomy and work-related pressure) in relation to self-reported psychological morbidity symptoms and early retirement intentions among a sample of hospital consultants in the NHS. Secondly, to investigate burnout as a mediating variable (i.e., indirect effect) of this postulated association. Figure 1 provides a visual representation of the study's postulated direct and indirect effects among independent and dependent variables.

[Insert Figure 1 here]

Method

Study design and sample

A cross-sectional quantitative survey was carried out between November and December 2015. The Human Resources departments of all the Health Boards in Wales (n=7) and Scotland (n=10) were approached to participate in this study, along with 12 NHS Trusts from England. All agreed to forward an electronic survey, administered through Bristol Online Survey, to all their consultants. It is not possible to determine how many consultants actually received the survey. We aimed to obtain a survey sample size of 500. This exceeded our power calculations assuming a total consultant population of 10,000 across these Health Boards and Trusts, a sample proportion of 50% and allowing 5% margin of error considering the finite population correction. The electronic survey yielded a response of 593 consultants. The study received ethical approval from Birkbeck University of London.

Measures

Surveyed consultants provided information on socio-demographic details, work-related pressure, job autonomy, burnout, early retirement intention, and anxiety and depressive symptoms. All utilised composite measures demonstrated a satisfactory level of internal reliability.

Psychosocial work characteristics

Two specific psychosocial work characteristics were examined by the current study: job autonomy and work-related pressure. The decision to examine only two (out of myriad of possible psychosocial work characteristic) was based on what the contemporary literature repeatedly highlights as particularly salient work characteristics to NHS consultants[33–35]. The English version of the Job Demands-Resources Questionnaire[36] was used to assess work-

related pressure and job autonomy. Work-related pressure consisted of four items and job autonomy three items. All items were rated on a Likert scale: *1* (never) to *5* (very often).

Burnout

The Maslach Burnout Inventory[22] was used to quantify the two examined dimensions of burnout: emotional exhaustion (9 items) and depersonalisation (5 items). Items were rated on a seven-point Likert scale (0, 'never' to 6, 'every day'). All subscale items were summed to create two composite scores. Higher scores are indicative of increased emotional exhaustion or depersonalisation. The summed scores on the two utilised composite measures were used to stratify the sample into 'high' and 'low' reference categories, with established norm scores of health professionals used to inform the categorization process[37,38]. A composite score of 27 or higher on the emotional exhausted scale and 13 or higher on the depersonalisation scale were used to categorise participants in the 'high' group.

Psychological Morbidity Symptoms

Symptoms of trait depression and anxiety were measured by the State Trait Personality Inventory[39]. This 80-item inventory contains eight scales that measures state and trait-related depression, anxiety, curiosity and anger. Only the ten-item scales pertaining to trait-related depression and anxiety were included in this study. The scales are among the most widely used for anxiety and depression with strong psychometric properties[39–41]. The frequency of each item was rated on a four-point Likert scale (1, 'almost never' and 4, 'almost always'), with high scores representing more frequent experience of anxiety and depressive symptoms. Although neither measure has clinically diagnostic cut-off points, participants in this study with scores higher than the 75th percentile of UK working norm scores were classed as high scoring (≥18 for anxiety; ≥20 for depression).

Work-related Attitudinal Outcome: Early retirement intention

Depending on the type of scheme, NHS consultants have the option of retiring at age 60 (1995 section) or 65 years (2008 section). Therefore, early retirement intention was assessed through one Likert-based item commonly used in epidemiological surveys of the working population[42]: "do you think you will be doing this job when you are 60 years old". Anchored from 0 ("I would not even want to be") to 6 "yes".

Statistical analysis

Descriptive statistics and study measures' internal reliability were analysed. Subsequently, bivariate two-tailed parametric correlations were calculated to examine the statistical association between study variables. Three multiple linear regression models were then carried out to examine the direct effects of the study's independent variables (job autonomy, work-related pressure, emotional exhaustion and depersonalisation) on the three dependent measures: anxiety and depression symptoms, and early retirement intention. Socio-demographic covariates (age, gender, speciality, country, tenure as consultant) were controlled for. Assumptions underlying multivariate linear regression were assessed by plotting residual errors and standardised residuals. Existence of multicollinearity was checked through variance inflation factors, and Durbin-Watson tests were conducted for correlated residuals. All these diagnostics fell within the acceptable ranges for each multiple linear regression model. SPSS (version 22) was used for data management and statistical analysis. Missing data was examined; with, in general, low levels observed (i.e., 1.9% in gender and 0.7% for consultant specialty). Such data was excluded from the analysis due their non-significant size.

Hayes'[43] PROCESS Model 4 macro was used to examine the indirect effects that psychosocial work characteristics had on consultants' psychological morbidity and turnover intention. Both emotional exhaustion and depersonalisation were examined as mediators within these relationships. This approach tests the indirect effect of both mediators, using a

calculation of 1000 bias-corrected bootstrapped confidence intervals (95%). Bootstrapping estimates model parameters and their standard errors by the repeated sampling of the study sample. These do not assume that sampling distributions are normal, which is especially applicable for mediation analyses[44]. Therefore, bootstrapping generates more accurate confidence intervals than other more commonly used mediation methods. In total six sets of analyses were carried out, with one set for each relationship both predictors (work-related pressure, job autonomy) and the three outcome measures (anxiety symptoms, depressive symptoms, early retirement intention). The paper is reported in accordance with the STROBE statement[45].

Results

In total, 593 responses were completed. A full demographical breakdown is presented in Table 1. The sample was relatively evenly split between England (32.5%), Wales (32%) and Scotland (35.4%). The majority of respondents were male (63.1%), and aged between 41-50 years (45.5%) and 51-60 years (31%). In total, eight speciality groups were represented, with the majority of respondents identifying as physicians (28.8%), surgeons (18.2%), anaesthesiologists (14%) and others' (15.7%).

Table 1: Sample distribution and the proportion of the sample categorised as 'high' on the examined study variables

		Burnout Dimensions		Psychological Morbidities	
Characteristics of Sample	**N (%[a])**	**High Emotional Exhaustion**	**High Depersonalisation**	**High Anxiety symptoms**	**High Depressive symptoms**
Substantive consultant	593 (100 %)	38·70%	13·00%	43·10%	36·10%
Countries:					
England	193 (32·5%)	37·82%	12·95%	52·13%	43·09%
Wales	190 (32·0%)	40·53%	12·63%	41·94%	38·17%
Scotland	210 (35·4%)	37·91%	13·74%	51·92%	36·54%
Gender:					

Male	374 (63·1 %)	37·43%	13·90%	47·33%	41·98%
Female	208 (35·1 %)	41·35%	12·02%	51·44%	31·25%
Not specified	11 (1·9 %)				
Age:					
30 - 40 years	119 (20·1 %)	41·18%	16·67%	50·83%	37·50%
41 - 50 years	267 (45·5 %)	35·58%	12·36%	47·49%	40·15%
51 - 60 years	184 (31·0 %)	42·93%	13·04%	52·22%	37·78%
>60 years	23 (3·9 %)	26·09%	0·00%	28·00%	24·00%
Speciality:					
Physician	171 (28·8%)	33·33%	14·04%	47·88%	35·15%
Surgeon	108 (18·2%)	43·52%	15·74%	48·54%	45·63%
Obstetrics/ Gynaecology	24 (4·0%)	37·50%	12·50%	41·67%	25·00%
Anaesthesia	83 (14·0%)	28·92%	13·25%	47·56%	40·24%
Radiology	41 (6·9%)	36·59%	12·20%	46·34%	36·59%
Psychiatry	47 (7·9%)	46·81%	8·51%	52·08%	37·50%
Pathology/ Microbiology	22 (3·7%)	59·09%	9·09%	72·73%	54·55%
Other	93 (15·7%)	44·09%	12·90%	47·31%	34·41%
Not specified	4 (0·7%)				

[a] *After excluding missing values*

Table 1 provides an overview of the proportion of the sample that were categorised as scoring 'high' on the examined study variables. These comparisons are not based on inferential statistics and are only for descriptive purposes. A sizable proportion of the survey sample reported a high level of depressive and anxiety symptoms. Four out of 10 consultants surveyed reported a high frequency of anxiety symptoms, and over a third of the sample were categorised as having a high degree of depressive symptoms. In relation to burnout, 38.7% of participants reported a high level of emotional exhaustion and 13% depersonalisation. The means, standard deviations and internal reliability for all study variables are presented in Table 2. Bivariate two-tailed parametric correlations among the independent and dependent measures are also provided in the same table.

Table 2: Descriptive statistics, correlations and reliability coefficients among study variables

Variable	Internal reliability	1	2	3	4	5	6	7	8	9
1. Job autonomy	0.88	6.15 (3·04)	-0.01	-0.23**	-0.15**	-0.25**	-0.33**	0.108	-0.01	-0.21**
2. Work-related pressure	0.90		11.71 (3.78)	0.40**	0.15**	0.20**	0.18**	-0.04	-0.06	0.10*
3. Emotional exhaustion	0.92			23.38 (1.67)	0.53**	0.57**	0.61**	0.02	-0.01	0.21**
4. Depersonalisation	0.85				5.70 (5.74)	0.40**	0.40**	-0.03	-0.08	0.14**
5. Anxiety symptoms	0.84					8.53 (4·84)	0.81**	-0.09*	-0.04	0.16**
6. Depression symptoms	0.91						8.92 (5.36)	-0.04	0.01	0.21**
7. Tenure	-							11·27 (7.29)	0.87**	-0.10*
8. Age	-								47·63 (7·47)	-0.11**
9. Early Retirement	-									1.58 (1.40)

Note. Mean (*SD*) are reported diagonally; **p<.01 level (2-tailed). *p<.05 level (2-tailed).

Direct effects between psychosocial work characteristics and psychological morbidities

Table 3 presents the results from the three multiple linear regression analyses. Consultants' job autonomy negatively predicted the frequency of their anxiety (β=-0.10, p<.01) and depressive (β=-0.17, p<.01) symptoms, and their early retirement intention (β=-0.19, p<.01). Surprisingly, work-related pressure did not predict any of the three dependent measures.

In terms of the burnout dimensions, emotional exhaustion positively predicted the frequency of consultants' anxiety (β=.47, p<.01) and depressive (β=.54, p<.01) symptoms, and stated intentions to retire early (β=.13, p<.05). Depersonalisation not only had smaller effect sizes than emotional exhaustion, but was only found to predict anxiety (β=.47, p<.01) and depressive (β=.54, p<.01) symptoms. The association between depersonalisation and early retirement intention was not significant.

Table 3: Multiple linear regression analyses – Dependant variables: anxiety symptoms, depressive symptoms and early retirement intention

Predictors	Anxiety Symptoms B/ β [CI]	Depressive Symptoms B/ β [CI]	Early Retirement Intention B/ β [CI]
(Constant)	-0.021	-0.84	2.89
Job autonomy	-0.15** / -0.1 [0.027, -0.04]	-0.30** / -.17 [-0.42, -0.17]	-0.09** / -.19 [-0.13, -0.05]
Work-related pressure	-0.03 / .02 [-.012, 0.07]	-0.07 / -.07 [-0.17, 0.03]	0.01 / .03 [-.02, 0.05]
Emotional exhaustion	0.19** / .47 [0.16, 0.23]	0.25** / .54 [0.21, 0.29]	0.02* / .13 [0.01, 0.03]
Depersonalisation	0.14** / .16 [0.07, 0.20]	0.11** / .12 [0.04, 0.18]	0.01 / .02 [-0.02, 0.03]
Specialty			
Pathology or Microbiology	0.97 / .04 [-0.84, 2.78]	0.71 / .02 [-1.22, 2.64]	-0.17 / -.02 [-0.82, 0.48]
Surgery	-0.75 / -.06 [-1.72, 0.22]	-0.53/ -.04 [-1.56, 0.50]	-0.09 / -.02 [0.43, 0.27]
Anaesthesia	-0.28 / -.02 [-1.34, 0.78]	0.28 / .02 [-0.85, 1.41]	-0.13 / -.03 [-0.51, 0.25]
Radiology	0.60 / .03 [-0.74, 1.95]	0.46 / .02 [-0.97, 1.90]	-0.08/ -.01 [-0.56, 0.41]
Psychiatry	0.34 / .02 [-0.94, 1.63]	-0.27 / -.01 [-1.64, 1.10]	0.27 / .05 [-0.19, 0.73]
Obstetrics/Gynaecology	-1.64 / -.07 [-3.31, 0.03]	-2.01* / -.08 [-3.79, -.22]	0.13 / .02 [0.48, 0.73]
Other	-0.62 / -0.05 [-1.61, 0.37]	-0.36 / -.02 [-1.42, 0.69]	-0.16 / -.04 [-0.52, 0.20]
Physician (ref)			
Age	0.17** / .27 [0.08, 0.26]	0.18** / .25 [0.08, 0.27]	-0.03 / -.13 [-0.06, 0.01]
Gender (male)	-1.17** / -.12 [-1.87, -0.47]	-0.02 / .01 [-0.77, -0.73]	-0.12 / -.04 [-0.37, 0.14]
Work experience (years)	-0.19** / -.29 [0.29, -0.10]	-0.18** / -.25 [-0.28, -0.08]	0.01 / 0.05 [-0.02, 0.04]
Country			
Wales	-0.82* / -.08 [-1.59, -0.04]	-0.69 / -.06 [-1.52, 0.14]	0.04 / 0.01 [-0.24, 0.32]
England	-0.24 / -0.02 [-1.03, 0.56]	-0.01 / .01 [-0.86, 0.84]	-0.14 / -0.04 [-0.42, 0.15]
Scotland (ref)			

Note. * $p < .05$, ** $p < .01$; CI: 95% unstandardised confidence intervals.

Indirect effects between psychosocial work characteristics and psychological morbidities

Fewer relationships involving socio-demographic variables were found. High frequency of anxiety symptoms associated with older consultants (β=.17, p<.01), consultants with less experience (β=-.19, p<.01) and being male (β=-.12, p<.01). Surveyed consultants from Wales had more frequent anxiety symptoms than compared to those sampled from Scotland (β=-.08, p<.05). For depressive symptoms, being older (β=.18, p<.01) and less experienced (β=-.18, p<.01) was associated with more frequent depressive symptoms. In terms of speciality, Obstetrics & Gynaecology consultants reported less depressive symptoms (β=- .08, p<.05) than Physicians. Surveyed consultants' intention to seek early retirement was not associated with any of the socio-demographic variables measured.

Six mediation analyses were carried using Hayes'[43] PROCESS macro to examine the mediating role of emotional exhaustion and depersonalisation (Table 4). Within each mediation analysis, socio-demographic variables that were found to predict the dependent variable in the multiple linear regressions above were controlled for. For anxiety symptoms this was gender, age, experience and consultants from Wales; for depressive symptoms age, tenure and Obstetrics & Gynaecology were controlled for.

Table 4: Estimates, standard errors, and confidence interval for indirect effects

	Anxiety symptoms[a]			Depressive symptoms[b]			Early retirement intention		
Predictor - Mediator	B	SE	95% CI	B	SE	95% CI	B	SE	95% CI
Job autonomy - Emotional exhaustion	-0.18	0.04	-.26, -.11	-0.22	0.04	-.31, -.14	0.02	0.01	.01, .03
Job autonomy - Depersonalisation	-0.04	0.02	-.09, -.02	-0.03	0.02	-.08, -.01	0.01	0.01	-.01, .01
Work-related pressure - Emotional exhaustion	0.25	0.04	.19, .34	0.33	0.04	.24, .42	-0.03	0.01	-.04, .-.01
Work-related pressure - Depersonalisation	0.03	0.01	.01, .05	0.03	0.01	.01, .05	-0.01	0.01	-.01, .01

Note. [a]Controlled for gender, age, experience, and consultants from Wales; [b]Controlled for age, experience, and Obstetrics & Gynaecology consultants.

In all six mediation analyses carried out, the direct relationships between the independent, mediator and dependent measures were consistent with those from the multiple linear regressions above, as such they are not reported here. In addition to direct effects, a series of significant indirect effects were observed. Emotional exhaustion was observed to mediate the relationship between job autonomy and all three outcome measures: anxiety (*B*=-.18, *SE*=.04, *p*<.05) and depressive symptoms (*B*=-.22, *SE*=.04, *p*<.05) and early retirement intention (*B*=.02, *SE*=.01, *p*<.05). Depersonalisation was observed to partially mediate the relationship between job autonomy and anxiety (*B*=-.04, *SE*=.02, *p*<.05) and depressive symptoms (*B*=-.03, *SE*=.02, *p*<.05). Depersonalisation, however, did not mediate the relationship between job autonomy and intentions for early retirement.

The mediation analyses did not observe any direct effects between work-related pressure and any other three dependent measures– congruent with the multiple linear regressions. However, evidence of indirect effects among the study variables was observed via both core burnout dimensions. Emotional exhaustion fully mediated the relationship between work-related pressure and the frequency of consultants' anxiety (*B*=.25, *SE*=.04, *p*<.05) and depressive symptoms (*B*=.33, *SE*=.04, *p*<.05), and stated intentions for early retirement (*B*=-.03, *SE*=.01, *p*<.05). Depersonalisation fully mediated the association between work-related pressures and anxiety (*B*=.03, *SE*=.01, *p*<.05) and depressive (*B*=.03, *SE*=.01, *p*<.05) symptoms. No indirect effect between work-related pressure and early retirement relationship as mediated by depersonalisation was observed.

Discussion

A large, and growing, research literature has examined the impact of psychosocial work characteristics in relation to a myriad of work-related wellbeing measures[5,7,8,12]. This

hazard–harm relationship is within the general working population strongly evidenced. However, it is important to understand the nature and driving mechanisms of this hazard-harm association within its given vocational and organisational contexts[21]. In consideration of this, the current study examined the nature and underpinning mechanisms of such postulated associations within a unique, and grossly under researched vocational group: NHS hospital-based consultants.

Approximately 40% of this sample were categorised as 'high' on emotional exhaustion, depressive symptoms and anxiety symptoms. These figures are higher than those reported by previous studies of NHS consultants[46–49], and are similar to equivalent surveys of junior doctors[18,50]. These descriptive findings highlight the importance of considering the psychological health of doctors (at various stages of their career) as an imperative occupational health issue that necessitates targeted workplace intervention. This descriptive finding highlights, we believe, the importance of considering consultants as a particularly at-risk occupational group in regards to burnout and symptoms of psychological morbidity.

The negative impact of poor job autonomy and work-related pressures has been strongly evidenced in relation to psychological morbidity symptoms and work-related attitudinal outcomes within the general working population[3,4,9,10]. Like previous findings, poor job autonomy was found to directly predict the increased frequency of depressive and anxiety symptoms among surveyed consultants and increased intentions to seek early retirement. Furthermore, this observed association was partially mediated by reported burnout symptoms. To our knowledge this is the first study to examine burnout symptoms (i.e., emotional exhaustions and depersonalisation) as a potential mediator between psychosocial work characteristics and psychological morbidity symptoms and work-related attitudinal outcomes as perceived by NHS consultants. However more broadly, these empirical findings contribute to a small, albeit growing, research domain within the wider burnout literature. It

provides evidence of burnout's contributory role to work-related wellbeing as both an outcome, but also an intervening variable. We would speculate that the nature of this association would also, by extension, be predicative of work-related behaviours (e.g., leaving the profession) and performance among medical professionals. However, this speculation remains untested but remains an important avenue for future research.

In contrast to the existing literature[3,4], work-related pressure did not have a direct association with surveyed consultants' reported symptoms of psychological morbidities and intentions to seek early retirement. However, surveyed consultants' reported symptoms of emotional exhaustion and depersonalisation were both observed to fully mediate the relationship between their perceived work-related pressures and reported psychological morbidities. It is important to highlight that the findings derived from the mediation analysis are based on cross-sectional data. However, it does suggest that while excessive and chronic work-related pressures may not be directly associated with surveyed consultants' psychological health, instead it appears that the experience of burnout may play an important role facilitating its detrimental impact. However, such postulations of directionality and causality require further systematic longitudinal investigation.

Despite the mediating role of the burnout dimensions, depersonalisation did not operate as a mediator where early retirement intention was an outcome. This is perhaps not surprising, as depersonalisation is defined as withdrawal from fully engaging with their current role[21]. Therefore, it may be that some consultants who cope at work by depersonalising may be less inclined to see early retirement as a method to leave their work environment. Nevertheless, the relationship that depersonalisation has with both depressive and anxiety symptoms suggests that this is not a healthy coping mechanism.

Practical implications

Our findings highlight the value of workplace health interventions targeted at adapting working conditions and proactively managing burnout among the NHS staff. One approach to improve the psychosocial work environment is job crafting which has been found to improve medical specialists' wellbeing and performance[51]. Socio-demographic variables had some relationship with consultants' psychological morbidity symptoms, which warrants further exploration in future research. Nevertheless, psychosocial work characteristics remain better predictors of the study outcomes used. Consequently, comprehensive interventions that simultaneously targeting organisational, material and work-time related conditions may be more beneficial to worker health, than interventions only targeting the individual[38]. Government and healthcare leaders need to consider how future organisational decisions in the NHS may further impact on consultants' psychosocial work characteristics and, in turn, their work-related wellbeing. Although the NHS is under increasing demands and financial strain, greater dialogue between consultants, hospital managers and government officials, at both the local and national level, will go some way in influencing how work-related pressure and job autonomy are perceived and managed[34,35].

Conclusion

The findings from the current study contribute to the small, but growing research area, namely: the examination of NHS's consultants' work-related wellbeing and the contributing role of their psychosocial working environment. Another important empirical contribution of this study is the observed evidence of experienced burnout symptoms mediating (either partially or fully) the observed relationship between job autonomy and work-related pressures in relation to surveyed consultants' psychological morbidity symptoms. This highlights the salient role of burnout as an intervening variable, and is especially concerning given the high prevalence of consultants scoring as 'high' on the burnout and psychological morbidity symptom measures. These findings emphasise the importance of preventing and mitigating

burnout, and the cultivation of skill discretion and autonomy among consultants as an important organisationally-focused preventive strategy. This is important, not only for the NHS' ability to provide safe and high quality care[30,52]; but also to maintain and retain a healthy and productive workforce[29].

Other Information

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Contributors

AK and JH conceived the study concept and design. AK and KT drafted the first version of the manuscript. KT and JH provided critical revision of the manuscript as it went through the revision process. SI and KT did the data management and statistical analyses. All authors contributed to the content and critical revision of the report, and agreed to submit the report for publication.

Declaration of interests

We have no competing interests to declare.

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Figure 1. Postulated direct and indirect effects of job autonomy and work-related pressures

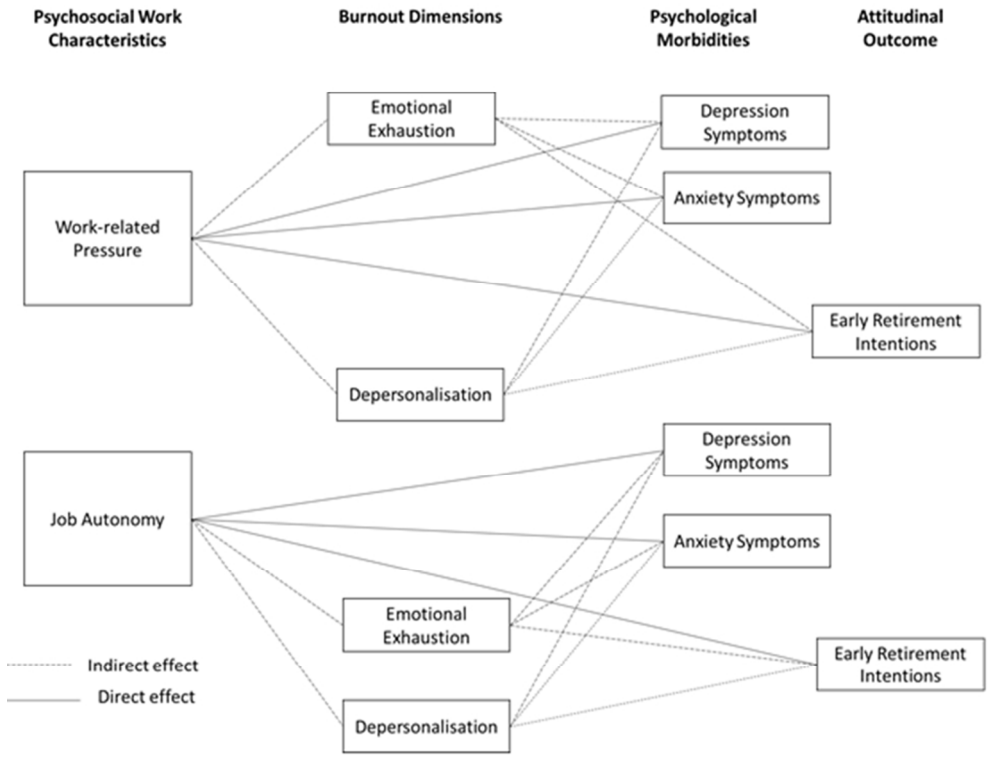

Figure 1. Postulated direct and indirect effects of job autonomy and work-related pressures

83x63mm (300 x 300 DPI)

STROBE Checklist for Psychosocial Work Characteristics, Burnout, Psychological Morbidity Symptoms and Early Retirement Intentions: A Cross-sectional Study of NHS Consultants in the United Kingdom.

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation	Location
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	In title the term "cross-sectional" is included
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	Abstract based on the journal's structure is included
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Pg. 1 of the manuscript, paragraph 1.
Objectives	3	State specific objectives, including any prespecified hypotheses	Pg. 6 under "Study Aims"
Methods			
Study design	4	Present key elements of study design early in the paper	Pg. 7 under "study design and sample"
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Pg. 7 under "study design and sample"
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	Pg. 7 under "study design and sample"
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Variables are introduced in the Introduction
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Pg. 8 under "Measures"
Bias	9	Describe any efforts to address potential sources of bias	
Study size	10	Explain how the study size was arrived at	Pg. 7 under "study design and sample"
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Pg 9 under "Statistical analysis"
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	Pg 9 under "Statistical analysis"
		(*b*) Describe any methods used to examine subgroups and interactions	Not applicable

		(*c*) Explain how missing data were addressed	Pg. 7 under "study design and sample"
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	Pg 9 under "Statistical analysis"
		(*e*) Describe any sensitivity analyses	Not applicable
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Pg. 7 under "study design and sample"
		(b) Give reasons for non-participation at each stage	Not applicable
		(c) Consider use of a flow diagram	Not applicable
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 1
		(b) Indicate number of participants with missing data for each variable of interest	Table 1
Outcome data	15*	Report numbers of outcome events or summary measures	Table 2
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Tables 2-4
		(*b*) Report category boundaries when continuous variables were categorized	Not applicable
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not applicable
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Tables 2-4
Discussion			
Key results	18	Summarise key results with reference to study objectives	Pg. 16, first paragraph of discussion
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Embedded in the Discussion section
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Discussion section
Generalisability	21	Discuss the generalisability (external validity) of the study results	Discussion section
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for	Not applicable

	the original study on which the present article is based

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Psychosocial Work Characteristics, Burnout, Psychological Morbidity Symptoms and Early Retirement Intentions: A Cross-sectional Study of NHS Consultants in the United Kingdom.

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Psychosocial Work Characteristics, Burnout, Psychological Morbidity Symptoms and Early Retirement Intentions: A Cross-sectional Study of NHS Consultants in the United Kingdom.

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Data Sharing Statement

Individual participant data collected under this study were deidentified which are reported in the form of tables. The original proposal of the study will be available upon request. Deidentified data will be shared for non-commercial research purpose given the consent of the lead author after the publications as per guidelines of the BMJ Open.

Transparency Declaration Lead author (Dr Atir Khan) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

Abstract

OBJECTIVES The objectives of this study are twofold. First, to examine the direct effect of psychosocial work characteristics (as measured by job autonomy and work-related pressure) in relation to self-reported psychological morbidity symptoms and early retirement retentions among a sample of hospital consultants in the National Health Service (NHS). Second, to investigate burnout as mediating variable (i.e., indirect effect) of these postulated associations.

DESIGN A cross-sectional observational study.

PARTICIPANTS 593 NHS consultants (Male = 63.1%) from hospitals in England, Scotland and Wales.

MEASURES Self-reported online questionnaires on work-related pressure and job autonomy (Job Demands-Resources Questionnaire); emotional exhaustion and depersonalisation (Maslach Burnout Inventory); depressive and anxiety symptoms (State Trait Personality Inventory); and a single-item on early retirement intention.

RESULTS This study observed high prevalence rates across all adverse health measures: emotional exhaustion (38.7%), depersonalisation (20.7%), anxiety symptoms (43.1%), and depressive symptoms (36.1%). Multiple linear regressions examined the postulated direct and indirect effects. Job autonomy had significant negative direct effects on the frequency of NHS consultants' anxiety and depressive symptoms, and their intention to retire early. Both emotional exhaustion and depersonalisation mediated the relationships that work-related pressure (full mediation) and job autonomy (partial mediation) had with self-reported symptoms of psychological morbidities. Only emotional exhaustion mediated the relationships where early retirement intention was the outcome. In terms of socio-demographic factors, age and years' experience predicted both burnout dimensions and psychological morbidity.

CONCLUSIONS This is the first study to observe job autonomy to be associated with the number of self-reported psychological morbidity symptoms and early retirement intentions in a sample of NHS consultants. Burnout dimensions mediated these relationships, indicating that interventions need to focus on enhancing working conditions and addressing burnout among NHS consultants before more severe symptoms of psychological morbidity are reported. This study has implications for NHS policy makers and senior leadership.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This is the first study to demonstrate the mediating role of burnout between psychosocial work characteristics of NHS consultants and their reported depressive and anxiety symptoms and intentions to seek early retirement.
- Mediations were examined using Hayes' PROCESS Model 4 macro with bootstrapping, which generates more accurate confidence intervals than other more commonly used mediation methods.
- This is a cross-sectional study design. As such, any interpretation of causality is not appropriate, as it is plausible that the relationship between the variables measured are reciprocal in nature.
- All study variables were drawn from self-report data of the individual consultant, making it vulnerable to common method bias.
- We were not able determine the response rate as we are unaware as to how many NHS trusts and health boards who agreed to participate actually followed through and sent the survey link to their consultants.

Introduction

The National Health Service (NHS) is one of the world's largest employers, with 1.3 million staff in England and Wales caring for an estimated 243 million patients annually[1]. For this system to continue to provide safe, sustainable and patient-centred care the wellbeing and retention of its workforce are critical considerations. The NHS performs comparatively worse across many measures of staff wellbeing; with sickness absence rates, on average, 27% higher than the UK public sector and 46% higher across all sectors[2]. Understanding the nature and impact of psychosocial working conditions on medical professionals' work-related wellbeing is, we believe, of clear empirical importance. In addition, its practical value in the development of evidenced-based workplace preventative solutions cannot be understated.

Psychosocial work characteristics and work-related wellbeing

Exposure to poor psychosocial work characteristics (e.g., poor job autonomy, work-related pressures, injustice at work, insufficient leadership) have been linked to a myriad of work-related wellbeing (inclusive of physical, psychological, behavioural and attitudinal) outcomes, including for example: poor mental health[3,4]; increased health impairing behaviours (e.g., increased smoking[5], alcohol consumption[6]); poor physical health (e.g., coronary heart disease[7,8]; reduced job satisfaction[9]; intention to quit[10]; and diminished organisational commitment[11]. In short, there is strong research to suggest that exposure to poor psychosocial work characteristics poses a clear risk to employees' health and work engagement. However, the nature and mechanisms underpinning such associations must be examined and understood at various levels (e.g., community, sectoral, and organisational), and within various vocational groups and occupational roles[12].

Within the healthcare sector, much of the available research has focused on a limited number of occupational groups (e.g., nurses[13,14]; social workers[15,16]; and, to a lesser degree,

doctors[17,18]). The importance of focusing on different occupational groups is evident in a study of German intensive care units, where nurses, junior physicians and senior physicians reported different levels of burnout, turnover intention and perceived nonbeneficial patient treatment[19]. While the extant literature examining doctors specifically is increasing, there has (to date) been little attempt to examine the nature of this association within a unique vocational subgroup: NHS hospital consultants. These doctors are among the most experienced and trained within this vocational group[20]. Their role as educators and supervisors of the next generation of doctors and nurses means their organisational contribution in the development of the current and future healthcare workforce is imperative[21].

The Mediating Role of Burnout

Burnout is one of the most commonly studied wellbeing constructs within the healthcare sector[22]; and, in particular, as a measure of work-related wellbeing among doctors. Burnout refers to a prolonged psychological response to chronic emotional and interpersonal stresses related to work[23,24], and manifests through symptoms of emotional exhaustion, depersonalisation and reduced personal accomplishment. *Emotional exhaustion* denotes being emotionally overextended and exhausted by work. *Depersonalisation* refers to an impersonal feeling towards people, and reduced *personal accomplishment* encompasses the reduced work effectiveness due to emotional exhaustion and depersonalisation. Studies[22,25,26] have found strong and consistent support for the emotional exhaustion and depersonalisation dimensional factors of burnout; and are, therefore, typically viewed as its' core conceptual components. However, the evidence surrounding professional accomplishment is comparatively mixed. Consequently, personal accomplishment is generally viewed as a separate, but related entity[25].

Evidence derived from reviews and meta-analyses demonstrate a significant association between poor psychosocial working conditions and doctors' self-reported burnout symptoms[17,18]. Within the extant literature, burnout has predominantly been conceptualised and investigated as the outcome of a poor psychosocial work environment. However, there is increasing attention being paid to the potential role of burnout as an antecedent to a range of health-related, attitudinal and behavioural outcomes, including: depression and anxiety[27], substance abuse[28], work performance[29], turnover intention[30] and patient care[31]. This is not surprising, as burnout depletes workers' energy and coping resources, which may results in increased physiological and psychological strain[32]. This may, in turn, trigger and exacerbate symptoms of psychological morbidity and work disengagement; and, consequently in the long term, interfere with performance[33]. The role of burnout has also been examined in relation to turnover intention, notably where healthcare workers' working conditions[34] and perceived nonbeneficial patient treatment[19] were predictors. Focusing specifically on doctors, to date limited research has sought to examine burnout as a possible mediating variable in relation to doctors' perceived working condition and their psychological health and experienced work-related attitudes. This study aims to address this gap in knowledge.

Study Aims

The objectives of this study are twofold. Firstly, to examine the direct effect of psychosocial work characteristics (job autonomy and work-related pressure) in relation to self-reported psychological morbidity symptoms and early retirement intentions among a sample of hospital consultants in the NHS. Secondly, to investigate burnout as a mediating variable (i.e., indirect effect) of this postulated association. Figure 1 provides a visual representation of the study's postulated direct and indirect effects among independent and dependent variables.

[Insert Figure 1 here]

Method

Study design and sample

A cross-sectional quantitative survey was carried out between November and December 2015. The Human Resources departments of all the Health Boards in Wales (n=7) and Scotland (n=10) were approached to participate in this study, along with 12 NHS Trusts from England. All agreed to forward an electronic survey, administered through Bristol Online Survey, to all their consultants. It is not possible to determine how many consultants actually received the survey. We used the response from a sample size of 500 consultants. This is based on a sample size calculation using survey sample method that considered a total consultant population of 10,000 across these Health Board and Trusts (assuming a proportion of 50%, a confidence interval of 95% and allowing 5% margin of error). The calculation yielded a required sample of 370 responses. This was increased to a larger sample of 500 to obtain better representation of the overall population. The study received ethical approval from Birkbeck University of London.

Measures

Surveyed consultants provided information on socio-demographic details (age, gender, speciality, country, tenure as consultant), work-related pressure, job autonomy, burnout, early retirement intention, and anxiety and depressive symptoms.

Psychosocial work characteristics

Two specific psychosocial work characteristics were examined by the current study: job autonomy and work-related pressure. The decision to examine only two (out of myriad of

possible psychosocial work characteristic) was based on what the contemporary literature repeatedly highlights as particularly salient work characteristics to NHS consultants[35–37]. These also serve as proxies for the two dimensions of the Job Demand-Control Model[38]. The English version of the Job Demands-Resources Questionnaire[39] was used to assess work-related pressure and job autonomy. Work-related pressure consisted of four items and job autonomy three items. All items were rated on a Likert scale: *1* (never) to *5* (very often).

Burnout

The Maslach Burnout Inventory[23] was used to quantify the two examined dimensions of burnout: emotional exhaustion (9 items) and depersonalisation (5 items). Items were rated on a seven-point Likert scale (0, 'never' to 6, 'every day'). All subscale items were summed to create two composite scores. Higher scores are indicative of increased emotional exhaustion or depersonalisation. The summed scores on the two utilised composite measures were used to stratify the sample into 'high' and 'low' reference categories, with established norm scores of health professionals used to inform the categorization process[40,41]. A composite score of 27 or higher on the emotional exhausted scale and 13 or higher on the depersonalisation scale were used to categorise participants in the 'high' group. The 'low' group consisted of those with a score of 13 or lower for emotional exhaustion, and 5 or lower for depersonalisation.

Psychological Morbidity Symptoms

Symptoms of trait depression and anxiety were measured by the State Trait Personality Inventory[42]. This 80-item inventory contains eight scales that measures state and trait-related depression, anxiety, curiosity and anger. Only the ten-item scales pertaining to trait-related depression and anxiety were included in this study. The scales are among the most widely used for anxiety and depression with strong psychometric properties[42–44]. The

frequency of each item was rated on a four-point Likert scale (1, 'almost never' and 4, 'almost always'), with high scores representing more frequent experience of anxiety and depressive symptoms. Although neither measure has clinically diagnostic cut-off points, participants in this study with scores higher than the 75th percentile of UK working norm scores were classed as high scoring (≥18 for anxiety; ≥20 for depression).

Work-related Attitudinal Outcome: Early retirement intention

Depending on the type of scheme, NHS consultants have the option of retiring at age 60 (1995 section) or 65 years (2008 section). Therefore, early retirement intention was assessed through one Likert-based item commonly used in epidemiological surveys of the working population[45]: "do you think you will be doing this job when you are 60 years old". Anchored from 0 ("I would not even want to be") to 6 "yes".

Statistical analysis

Descriptive statistics and study measures' internal consistency using Cronbach's alpha were analysed. Subsequently, bivariate two-tailed parametric correlations were calculated to examine the statistical association between study variables. Three multiple linear regression models were then carried out to examine the direct effects of the study's predictor variables (job autonomy, work-related pressure, emotional exhaustion and depersonalisation) on the three dependent measures: anxiety and depressive symptoms, and early retirement intention. Two additional multiple linear regressions tested the direct effects that job autonomy and work-related pressure had on emotional exhaustion and depersonalisation. Socio-demographic covariates (age, gender, speciality, country, tenure as consultant) were controlled for. Assumptions underlying multivariate linear regression were assessed by plotting residual errors and standardised residuals. Existence of multicollinearity was checked through variance inflation factors, and Durbin-Watson tests were conducted for

correlated residuals. All these diagnostics fell within the acceptable ranges for each multiple linear regression model. SPSS (version 22) was used for data management and statistical analysis. Missing data was examined; with, in general, low levels observed (i.e., 1.9% in gender and 0.7% for consultant specialty). Such data was excluded from the analysis due their non-significant size.

Hayes'[46] PROCESS Model 4 macro was used to examine the indirect effects that psychosocial work characteristics (i.e., job autonomy and work-related pressure) had on consultants' psychological morbidity and turnover intention. Both emotional exhaustion and depersonalisation were examined as mediators within these relationships. This approach tests the indirect effect of both mediators, using a calculation of 1000 bias-corrected bootstrapped confidence intervals (95%). Bootstrapping estimates model parameters and their standard errors by the repeated sampling of the study sample. These do not assume that sampling distributions are normal, which is especially applicable for mediation analyses[47]. Therefore, bootstrapping generates more accurate confidence intervals than other more commonly used mediation methods. In total six sets of analyses were carried out, with one set for each relationship both predictors (work-related pressure, job autonomy) and the three outcome measures (anxiety symptoms, depressive symptoms, early retirement intention). Consultants' gender, age, experience, country and speciality were included as covariates. The paper is reported in accordance with the STROBE statement[48].

Patient and public involvement

No patients or the public were involved in this study.

Results

In total, 593 responses were completed. A full demographical breakdown is presented in Table 1. The sample was relatively evenly split between England (32.5%), Wales (32%)

and Scotland (35.4%). The majority of respondents were male (63.1%), and aged between 41-50 years (45.5%) and 51-60 years (31%). In total, eight speciality groups were represented, with the majority of respondents identifying as physicians (28.8%), surgeons (18.2%), anaesthesiologists (14%) and others' (15.7%).

Table 1: Sample distribution and the proportion of the sample categorised as 'high' on the examined study variables

Sample Characteristics	N (%[a])	Burnout Dimensions				Psychological Morbidities	
		Emotional Exhaustion		Depersonalisation		High Anxiety symptoms	High Depressive symptoms
		High	Low	High	Low		
Total sample	593 (100 %)	38·70%	21.59%	20.74%	58.85%	43·10%	36·10%
Countries:							
England	193 (32·5%)	37·82%	8.8%	22.27%	56.48%	52·13%	43·09%
Wales	190 (32·0%)	40·21%	27.51%	20.11%	58.73%	41·94%	38·17%
Scotland	210 (35·4%)	37·91%	18.48%	20.38%	61.13%	51·92%	36·54%
Gender:							
Male	374 (63·1 %)	37·43%	25.67%	21.39%	55.88%	47·33%	41·98%
Female	208 (35·1 %)	41·35%	13.94%	20.19%	64.42%	51·44%	31·25%
Not specified	11 (1·9 %)						
Age:							
30 - 40 years	119 (20·1 %)	41·18%	20.83%	25.83%	57.50%	50·83%	37·50%
41 - 50 years	267 (45·5 %)	35·58%	21.35%	19.10%	58.43%	47·49%	40·15%
51 - 60 years	184 (31·0 %)	42·93%	20.00%	20.54%	58.38%	52·22%	37·78%
>60 years	23 (3·9 %)	26·09%	41.67%	12.50%	79.17%	28·00%	24·00%
Tenure:							
< 1 year	25 (4.2%)	28.00%	24.00%	24.00%	64.00%	60.00%	53.00%
1 – 5 years	135 (22.9%)	37.04%	22.96%	20.76%	62.22%	56.29%	50.37%
6 – 10 years	154 (26.1%)	70.91%	20.13%	18.18%	56.49%	50.00%	43.51%
11 – 15 years	112 (19.0%)	37.50%	21.43%	22.32%	54.46%	50.89%	40.18%
16 – 20 years	86 (14.6%)	39.53%	15.12%	24.41%	59.30%	50.00%	44.19%
> 21 years	78 (13.2%)	41.02%	28.20%	17.94%	61.54%	39.74%	33.33%
Not specified	3 (0.5%)						
Speciality:							
Physician	171 (28·8%)	33·33%	22.35%	19.41%	61.18%	47·88%	35·15%
Surgeon	108 (18·2%)	43·52%	19.44%	27.48%	46.30%	48·54%	45·63%
Obstetrics/ Gynaecology	24 (4·0%)	37·50%	12.50%	12.50%	66.67%	41·67%	25·00%
Anaesthesia	83 (14·0%)	28·92%	28.91%	25.30%	54.22%	47·56%	40·24%
Radiology	41 (6·9%)	36·59%	24.39%	19.51%	65.85%	46·34%	36·59%

Psychiatry	47 (7·9%)	46·81%	22.92%	10.40%	62.50%	52·08%	37·50%
Pathology/ Microbiology	22 (3·7%)	59·09%	18.18%	9.09%	63.64%	72·73%	54·55%
Other	93 (15·7%)	44·09%	17.20%	22.58%	65.59%	47·31%	34·41%
Not specified	4 (0·7%)						

[a] *After excluding missing values*

Note: Risk for emotional exhaustion (high: ≥27; low ≤13) and depersonalisation (high: ≥13; low ≤5) was based on composite score on the Maslach Burnout Inventory; High depressive (≥*20*) and anxiety (≥*18)* was based on composite score on the State Trait Personality Inventory representing more frequent experience of symptoms.

Table 1 provides an overview of the proportion of the sample that were categorised as scoring 'high' on the examined study variables. These comparisons are not based on inferential statistics and are only for descriptive purposes. A sizable proportion of the survey sample reported a high level of depressive and anxiety symptoms. Four out of 10 consultants surveyed reported a high frequency of anxiety symptoms, and over a third of the sample were categorised as having a high degree of depressive symptoms. In relation to burnout, 38.7% of participants reported a high level of emotional exhaustion and 20.74% depersonalisation. The means, standard deviations and internal consistency for all study variables are presented in Table 2. All utilised composite measures demonstrated a satisfactory level of internal consistency. Bivariate two-tailed parametric correlations among the predictor and dependent measures are also provided in the same table.

Table 2: Descriptive statistics, correlations and reliability coefficients among study variables

Variable	Internal consistency (Cronbach α)	1	2	3	4	5	6	7	8	9
1. Job autonomy	0.88	6.15 (3·04)	-0.01	-0.23**	-0.15**	-0.25**	-0.33**	0.108	-0.01	-0.21**
2. Work-related pressure	0.90		11.71 (3.78)	0.40**	0.15**	0.20**	0.18**	-0.04	-0.06	0.10*
3. Emotional exhaustion	0.92			23.38 (1.67)	0.53**	0.57**	0.61**	0.02	-0.01	0.21**
4. Depersonalisation	0.85				5.70 (5.74)	0.40**	0.40**	-0.03	-0.08	0.14**
5. Anxiety symptoms	0.84					8.53 (4·84)	0.81**	-0.09*	-0.04	0.16**
6. Depressive symptoms	0.91						8.92 (5.36)	-0.04	0.01	0.21**
7. Tenure	-							11·27 (7.29)	0.87**	-0.10*

8. Age	-	47·63 (7·47)	-0.11**
9. Early Retirement	-		1.58 (1.40)

Note. Mean (*SD*) are reported diagonally; **p<.01 level (2-tailed). *p<.05 level (2-tailed).

Direct effects between psychosocial work characteristics and psychological morbidities

Fewer relationships involving socio-demographic variables were found. High frequency of anxiety symptoms associated with older consultants (β=.17, p<.01), consultants with less experience (β=-.19, p<.01) and being male (β=-.12, p<.01). Surveyed consultants from Wales had more frequent anxiety symptoms than compared to those sampled from Scotland (β=-.08, p<.05). For depressive symptoms, being older (β=.18, p<.01) and less experienced (β=-.18, p<.01) was associated with more frequent depressive symptoms. In terms of speciality, Obstetrics & Gynaecology consultants reported less depressive symptoms (β=- .08, p<.05) than Physicians. Surveyed consultants' intention to seek early retirement was not associated with any of the socio-demographic variables measured.

Table 3 presents the results from the five multiple linear regression analyses. Consultants' job autonomy negatively predicted the level of consultant's emotional exhaustion (β=-.26, p<.01) and depersonalisation (β=-.17, p<.01), as well as the frequency of their anxiety (β=-0.10, p<.01) and depressive (β=-0.17, p<.01) symptoms, and their early retirement intention (β=-0.19, p<.01). Work-related pressure only predicted exhaustion (β=.38, p<.01) and depersonalisation (β=.14, p<.01), but not any of the other three dependent measures.

In terms of the burnout dimensions, emotional exhaustion positively predicted the frequency of consultants' anxiety (β=.47, p<.01) and depressive (β=.54, p<.01) symptoms, and stated intentions to retire early (β=.13, p<.05). Depersonalisation only predicted anxiety (β=.16, p<.01) and depressive (β=.12, p<.01) symptoms. The association between depersonalisation and early retirement intention was not significant.

Table 3: Multiple linear regression analyses – Dependant variables: anxiety symptoms, depressive symptoms and early retirement intention

Predictors	Emotional Exhaustion B/ β [CI]	Depersonalisation B/ β [CI]	Anxiety Symptoms B/ β [CI]	Depressive Symptoms B/ β [CI]	Early Retirement Intention B/ β [CI]
(Constant)	19.74		-0.021	-0.84	2.89
Job autonomy	-0.99** / .26 [-1.29, -0.69]	-0.33** / -.17 [-0.48, -0.18]	-0.15** / -0.1 [0.027, -0.04]	-0.30** / -.17 [-0.42, -0.17]	-0.09** / -.19 [-0.13, -0.05]
Work-related pressure	1.19** / .38 [0.96, 1.45]	0.22** / .14 [0.09, 0.34]	-0.03 / .02 [-.012, 0.07]	-0.07 / -.07 [-0.17, 0.03]	0.01 / .03 [-.02, 0.05]
Emotional exhaustion			0.19** / .47 [0.16, 0.23]	0.25** / .54 [0.21, 0.29]	0.02* / .13 [0.01, 0.03]
Depersonalisation			0.14** / .16 [0.07, 0.20]	0.11** / .12 [0.04, 0.18]	0.01 / .02 [-0.02, 0.03]
Specialty					
Pathology or Microbiology	6.58** / .10 [0.33, 12.06]	-1.19 / -.04 [-3.60, 1.38]	0.97 / .04 [-0.84, 2.78]	0.71 / .02 [-1.22, 2.64]	-0.17 / -.02 [-0.82, 0.48]
Surgery	2.00 / .07 [-0.54, 4.52]	1.84* / .12 [0.45, 3.33]	-0.75 / -.06 [-1.72, 0.22]	-0.53/ -.04 [-1.56, 0.50]	-0.09 / -.02 [0.43, 0.27]
Anaesthesia	-.03 / -.01 [-2.95, 2.98]	0.81 / .05 [-0.60, 2.32]	-0.28 / -.02 [-1.34, 0.78]	0.28 / .02 [-0.85, 1.41]	-0.13 / -.03 [-0.51, 0.25]
Radiology	-2.72 / -.06 [-5.67, 0.66]	-1.09 / -.05 [-2.88, 0.79]	0.60 / .03 [-0.74, 1.95]	0.46 / .02 [-0.97, 1.90]	-0.08/ -.01 [-0.56, 0.41]
Psychiatry	2.97 / .07 [-0.58, 0.66]	0.04 / .01 [-1.58, 1.72]	0.34 / .02 [-0.94, 1.63]	-0.27 / -.01 [-1.64, 1.10]	0.27 / .05 [-0.19, 0.73]
Obstetrics/ Gynaecology	-1.68 / -.03 [-6.04, 3.04]	-0.40 / -.01 [-2.83, 2.41]	-1.64 / -.07 [-3.31, 0.03]	-2.01* / -.08 [-3.79, -.22]	0.13 / .02 [0.48, 0.73]
Other	1.87 / -.03 [-0.54, 4.80]	0.32 / .02 [-1.14, 1.73]	-0.62 / -0.05 [-1.61, 0.37]	-0.36 / -.02 [-1.42, 0.69]	-0.16 / -.04 [-0.52, 0.20]
Physician (ref)					
Age	-2.11* / -.14 [-3.95, -0.27]	-2.00** / -.28 [-2.97, -1.01]	0.17** / .27 [0.08, 0.26]	0.18** / .25 [0.08, 0.27]	-0.03 / -.13 [-0.06, 0.01]
Gender (male)	-.17 / -.07 [-3.70, 0.01]	0.16 / .01 [-0.84, 1.17]	-1.17** / -.12 [-1.87, -0.47]	-0.02 / .01 [-0.77, -0.73]	-0.12 / -.04 [-0.37, 0.14]
Work experience (years)	0.30** / .19 [0.08, 0.50]	0.18** / .22 [0.07, 0.28]	-0.19** / -.29 [0.29, -0.10]	-0.18** / -.25 [-0.28, -0.08]	0.01 / 0.05 [-0.02, 0.04]
Country					
Wales	-0.64 [-2.69, 1.52]	0.13 / .23 [-1.18, 1.03]	-0.82* / -.08 [-1.59, -0.04]	-0.69 / -.06 [-1.52, 0.14]	0.04 / 0.01 [-0.24, 0.32]
England	-0.80 [-2.95, 1.30]	-0.12 / -.01 [-1.18, 1.03]	-0.24 / -0.02 [-1.03, 0.56]	-0.01 / .01 [-0.86, 0.84]	-0.14 / -0.04 [-0.42, 0.15]
Scotland (ref)					
F (*df*)	12.82	3.64	21.94	26.26	3.48
df	14, 569	14, 568	16, 568	16, 568	16, 561

Note. * $p < .05$, ** $p < .01$; CI: 95% unstandardised confidence intervals.

Indirect effects between psychosocial work characteristics and psychological morbidities

Six mediation analyses were carried using Hayes'[46] PROCESS macro to examine the mediating role of emotional exhaustion and depersonalisation. Table 4 presents that emotional exhaustion mediated the relationship between job autonomy and all three outcome measures: anxiety (-0.20, [95% CI -0.27, -0.12]) and depressive symptoms (-0.24, [95% CI -0.33, -0.15]) and early retirement intention (0.02, [95% CI 0.01, 0.04]). Depersonalisation was observed to partially mediate the relationship between job autonomy and anxiety (-0.05, [95% CI -0.09, -0.02]) and depressive symptoms (-0.04, [95% CI [-0.08, -0.01]). Depersonalisation, however, did not mediate at all the relationship between job autonomy and intentions for early retirement. Comparison of both mediators show that emotional exhaustion was the stronger mediator in relation to anxiety (-0.15, [95% CI -0.23, -0.08]) and depressive symptoms (-0.24 [95% CI -0.29, -0.11]), but not for early retirement intention (0.02, [95% CI -0.01, 0.04]).

Table 4: Estimated coefficients for mediation model with job autonomy as the predictor

Mediator	Outcome	Effect of predictor on mediator (a)	Effect of mediator on outcome (b)	Indirect effect of predictor on outcome (a*b) with 95% CI	Total effect of predictor on outcome (c)	Direct effect of predictor on outcome (c')
Emotional Exhaustion	Anxiety Symptoms	-1.04**	0.19**	-0.20 [-0.27, -0.12]	-0.40**	-0.16**
Depersonalisation	Anxiety Symptoms	-0.34**	0.14**	-0.05 [-0.09, -0.02]		
Emotional Exhaustion	Depressive symptoms	-1.04**	0.24**	-0.24 [-0.33, -0.15]	-0.60**	-0.31**
Depersonalisation	Depressive symptoms	-0.34**	0.11**	-0.04 [-0.08, -0.01]		
Emotional Exhaustion	Early retirement intention	-1.03**	-0.02**	0.02 [0.01, 0.04]	0.11**	0.09**
Depersonalisation	Early retirement intention	-0.34**	-0.01	0.01 [-0.01, 0.01]		

Note. Gender, age, experience, country and speciality were included as covariates. * $p < .05$, ** $p < .01$; CI: 95% unstandardised confidence intervals.

The mediation analyses did not observe any direct effects between work-related pressure and any other three dependent measures. However, evidence of indirect effects among the study variables was observed via both core burnout dimensions (Table 5). Emotional exhaustion fully mediated the relationship between work-related pressure and the frequency of consultants' anxiety (0.25, [95% CI 0.18, 0.33]) and depressive symptoms (0.33, [95% CI 0.25, 0.42]), and stated intentions for early retirement (0.03, [95% CI -0.05, -0.01]). Depersonalisation fully mediated the association between work-related pressures and anxiety (0.03, [95% CI 0.01, 0.06]) and depressive (0.03, [95% CI 0.01, 0.05]) symptoms. No indirect effect between work-related pressure and early retirement relationship as mediated by depersonalisation were observed. In all three relationships, emotional exhaustion operated as the stronger mediator: anxiety symptoms (0.22, [95% CI 0.15, 0.30]), depressive symptoms (0.30 [95% CI 0.22, 0.39]) and early retirement intention (0.03, [95% CI -0.05, -0.01])

Table 5: Estimated coefficients for mediation model with work-related pressure as the predictor

Mediator	Outcome	Effect of predictor on mediator (a)	Effect of mediator on outcome (b)	Indirect effect of predictor on outcome (a*b) with 95% CI	Total effect of predictor on outcome (c)	Direct effect of predictor on outcome (c')
Emotional Exhaustion	Anxiety Symptoms	1.22**	0.20**	0.25 [0.18, 0.33]	0.24**	-0.04
Depersonalisation	Anxiety Symptoms	0.23**	0.14**	0.03 [0.01, 0.06]		
Emotional Exhaustion	Depressive symptoms	1.22**	0.27**	0.33 [0.25, 0.42]	0.26**	-0.09
Depersonalisation	Depressive symptoms	0.23**	0.11**	0.03 [0.01, 0.05]		
Emotional Exhaustion	Early retirement intention	1.24**	-0.02**	-0.03 [-0.05, -0.01]	-0.04*	-0.01
Depersonalisation	Early retirement intention	0.23**	-0.01	-0.01 [-0.01, 0.01]		

Note. Gender, age, experience, country and speciality were included as covariates. * $p < .05$, ** $p < .01$; CI: 95% unstandardised confidence intervals.

Discussion

A large, and growing, research literature has examined the impact of psychosocial work characteristics in relation to a myriad of work-related wellbeing measures[5,7,8,12]. This hazard–harm relationship is within the general working population strongly evidenced. However, it is important to understand the nature and driving mechanisms of this hazard-harm association within its given vocational and organisational contexts[22]. In consideration of this, the current study examined the nature and underpinning mechanisms of such postulated associations within a unique, and grossly under researched vocational group: NHS hospital-based consultants.

Approximately 40% of this sample were categorised as 'high' on emotional exhaustion, depressive symptoms and anxiety symptoms. These figures are higher than those reported by previous studies of NHS consultants[49–52], and are similar to equivalent surveys of junior doctors[18,53]. It is, however, important to note that these comparison figures are drawn from studies that not only use different sampling approaches, but also used different measures for depressive and anxiety symptoms[49–51], or did not publish the cut-off points used[18,52,53]. The latter is important considering that different studies using the same measures have utilized different cut-off points from each other[40]. These descriptive findings highlight the importance of considering the psychological health of doctors (at various stages of their career) as an imperative occupational health issue that necessitates targeted workplace intervention. This descriptive finding highlights, we believe, the importance of considering consultants as a particularly at-risk occupational group in regards to burnout and symptoms of psychological morbidity.

The negative impact of poor job autonomy and work-related pressures has been strongly evidenced in relation to psychological morbidity symptoms and work-related attitudinal outcomes within the general working population[3,4,9,10]. Like previous findings, poor job autonomy was found to directly predict the increased frequency of depressive and anxiety symptoms among surveyed consultants and increased intentions to seek early retirement. Furthermore, this observed association was partially mediated by reported burnout symptoms. According to the conservation of resources theory (COR)[54], a depletion of energy and coping resources due to burnout can result in a downward spiral that exacerbates resource loss in other areas, including physiological and psychological resources that may trigger depressive and anxiety symptoms[33]. Similarly, COR theory postulates that when faced with exhaustion, energy depletion and depersonalisation, doctors experiencing burnout may view leaving the profession as a mechanism in which to protect their remaining resources[24]. Doctors leaving presents a significant loss of skill, knowledge and experience to the health service[35,36]

To our knowledge this is the first study to examine burnout symptoms (i.e., emotional exhaustions and depersonalisation) as a potential mediator between psychosocial work characteristics and psychological morbidity symptoms and work-related attitudinal outcomes as perceived by NHS consultants. However more broadly, these empirical findings contribute to a small, albeit growing, research domain within the wider burnout literature. It provides evidence of burnout's contributory role to work-related wellbeing as both an outcome, but also an intervening variable. We would speculate that the nature of this association would also, by extension, be predicative of work-related behaviours (e.g., leaving the profession) and performance among medical professionals. However, this speculation remains untested but remains an important avenue for future research.

The surveyed consultants' in this study reported symptoms of emotional exhaustion and depersonalisation were both observed to fully mediate the relationship between their perceived work-related pressures and reported psychological morbidities. This is consistent with previous studies, using nurses[34] or mixed occupational groups[19], that have found burnout to mediate this relationship where turnover intention was the outcome measures. It is important to highlight that the findings derived from the mediation analysis are based on cross-sectional data. However, it does suggest that while excessive and chronic work-related pressures may not be directly associated with surveyed consultants' psychological health, instead it appears that the experience of burnout may play an important role facilitating its detrimental impact. However, it is plausible that the relationship between job autonomy, burnout, depressive and anxiety symptoms, and work-related stress may be reciprocal in nature. Therefore, such postulations of directionality and causality require further systematic longitudinal investigation.

Despite the mediating role of the burnout dimensions, depersonalisation did not operate as a mediator where early retirement intention was an outcome. This is perhaps not surprising, as depersonalisation is defined as withdrawal from fully engaging with their current role[22]. Therefore, it may be that some consultants who cope at work through depersonalisation behavioural and cognitive actions may be less inclined to see early retirement as a method to leave their work environment, evidenced by an absence of this relationship in the analysis above. Nevertheless, the relationship that depersonalisation has with both depressive and anxiety symptoms suggests that this is not a healthy coping mechanism. It is also plausible that the resource and energy draining nature of emotional exhaustion means it is a stronger driver of NHS consultants looking to retire early.

Practical implications

Although reviews[55,56] have highlighted that individual-level cognitive, behavioural and mindfulness based interventions can be effective in coping with burnout in the healthcare sector, our findings highlight the value of workplace health interventions targeted at adapting working conditions and proactively managing burnout among the NHS staff. One approach to improve the psychosocial work environment is job crafting which has been found to improve medical specialists' wellbeing and performance[57]. Socio-demographic variables had some relationship with consultants' psychological morbidity symptoms, which warrants further exploration in future research. Nevertheless, psychosocial work characteristics remain better predictors of the study outcomes used. Consequently, comprehensive interventions that simultaneously targeting organisational, material and work-time related conditions may be more beneficial to worker health, than interventions only targeting the individual[58]. Government and healthcare leaders need to consider how future organisational decisions in the NHS may further impact on consultants' psychosocial work characteristics and, in turn, their work-related wellbeing. Although the NHS is under increasing demands and financial strain, greater dialogue between consultants, hospital managers and government officials, at both the local and national level, will go some way in influencing how work-related pressure and job autonomy are perceived and managed[36,37].

Strengths and limitations

This study, to the best of our knowledge, is the first to demonstrate the mediating role of burnout between psychosocial work characteristics of NHS consultants and their reported depressive and anxiety symptoms and intentions to seek early retirement. Using a broad range of standard psychometric measures with reported cut-off scores allows for comparison with other studies of this (and other) professional groups. Also, Hayes' PROCESS Model 4 macro with bootstrapping was used to test mediations, which generates more accurate confidence intervals than other more commonly used mediation methods.

In addition to the issue of cross-sectional data already discussed, a number of further limitations need to be acknowledged. First, because email invitations were sent via hospitals, we were not able to determine the response rate for this study. The sample size is smaller than that of past research into the prevalence of psychological morbidity amongst UK consultants[1,2]. This means that any generalizing this study's findings to the NHS consultant population, or even consultants more broadly, needs to acknowledge these sample and sampling limitations. The second limitation recognises that all study variables were drawn from self-report data of the individual consultant, making it vulnerable to common method bias; but, at the same time, this is an established method in quantitative research. Finally, it is important to reiterate that the measures used for depressive and anxiety symptoms do not reflect a clinical diagnosis of depression and anxiety. Instead, it represents the number of relevant symptoms and, therefore, these prevalence statistics should not be conflated with actual levels of depression or anxiety.

Conclusion

The findings from the current study contribute to the small, but growing research area, namely: the examination of NHS's consultants' work-related wellbeing and the contributing role of their psychosocial working environment. Another important empirical contribution of this study is the observed evidence of experienced burnout symptoms mediating (either partially or fully) the observed relationship between job autonomy and work-related pressures in relation to surveyed consultants' psychological morbidity symptoms. This highlights the salient role of burnout as an intervening variable, and is especially concerning given the high prevalence of consultants scoring as 'high' on the burnout and psychological morbidity symptom measures. These findings emphasise the importance of preventing and mitigating burnout, and the cultivation of skill discretion and autonomy among consultants as an important organisationally-focused preventive strategy. This is important, not only for the

NHS' ability to provide safe and high quality care[31,59]; but also to maintain and retain a healthy and productive workforce[30].

Other Information

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Author Contributions

AK and JH conceived the study concept and design. AK and KT drafted the first version of the manuscript. KT and JH provided critical revision of the manuscript as it went through the revision process. SI and KT did the data management and statistical analyses. All authors contributed to the content and critical revision of the report, and agreed to submit the report for publication.

Declaration of interests

We have no competing interests to declare.

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Figure 1. Postulated direct and indirect effects of job autonomy and work-related pressures

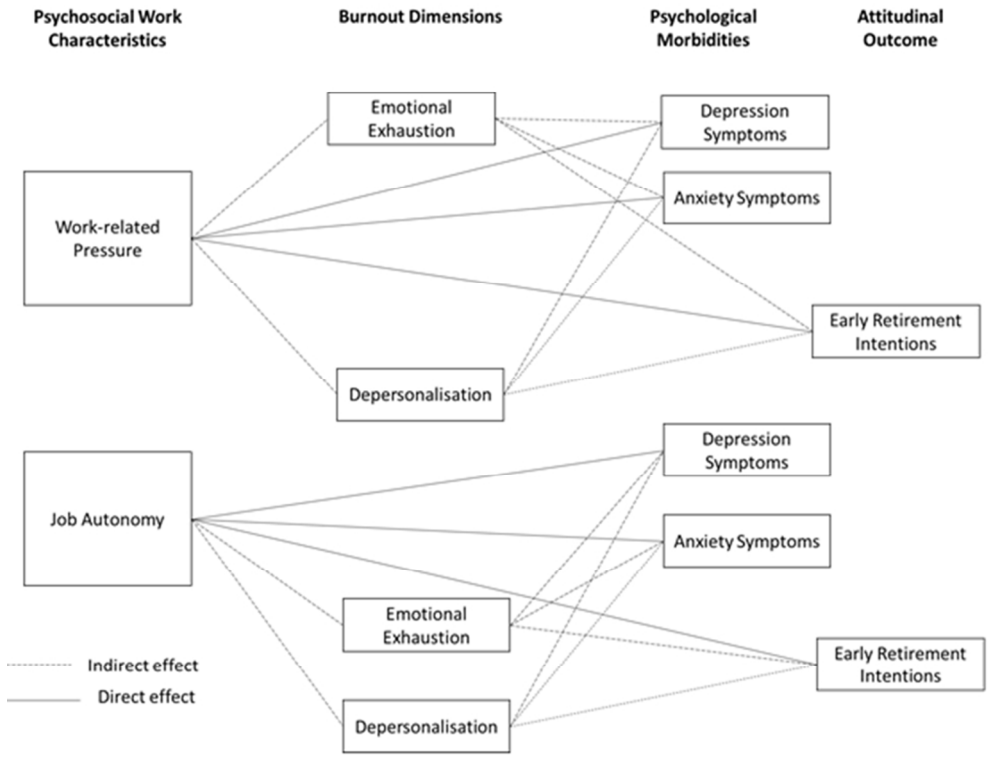

Figure 1. Postulated direct and indirect effects of job autonomy and work-related pressures

83x63mm (300 x 300 DPI)

STROBE Checklist for Psychosocial Work Characteristics, Burnout, Psychological Morbidity Symptoms and Early Retirement Intentions: A Cross-sectional Study of NHS Consultants in the United Kingdom.

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation	Location
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	In title the term "cross-sectional" is included
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	Abstract based on the journal's structure is included
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Pg. 4 of the manuscript, paragraph 1.
Objectives	3	State specific objectives, including any prespecified hypotheses	Pg. 6 under "Study Aims"
Methods			
Study design	4	Present key elements of study design early in the paper	Pg. 7 under "study design and sample"
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Pg. 7 under "study design and sample"
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	Pg. 7 under "study design and sample"
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Variables are introduced in the Introduction
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Pg. 7 under "Measures"
Bias	9	Describe any efforts to address potential sources of bias	
Study size	10	Explain how the study size was arrived at	Pg. 7 under "study design and sample"
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Pg 9 under "Statistical analysis"
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	Pg 9 under "Statistical analysis"
		(*b*) Describe any methods used to examine subgroups and interactions	Not applicable

		(*c*) Explain how missing data were addressed	Pg. 7 under "study design and sample"
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	Pg 9 under "Statistical analysis"
		(*e*) Describe any sensitivity analyses	Not applicable
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Pg. 7 under "study design and sample"
		(b) Give reasons for non-participation at each stage	Not applicable
		(c) Consider use of a flow diagram	Not applicable
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 1
		(b) Indicate number of participants with missing data for each variable of interest	Table 1
Outcome data	15*	Report numbers of outcome events or summary measures	Table 2
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Tables 2-5
		(*b*) Report category boundaries when continuous variables were categorized	Not applicable
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not applicable
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Tables 2-5
Discussion			
Key results	18	Summarise key results with reference to study objectives	Pg. 17, first paragraph of discussion
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Pg. 20, strengths and limitations section
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Discussion section
Generalisability	21	Discuss the generalisability (external validity) of the study results	Discussion section
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for	Title Page

	the original study on which the present article is based

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.