

Hospital Workforce Engagement, Satisfaction, Burnout and Effects on Mortality: Findings from the English National Health Service Staff Surveys

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Abstract

Previous studies of healthcare organizations' workforces and their performance have focused on burnout and its impact on care. The aim of this research is to expand on this and examine the association of positive organizational states, engagement and recommendation of employer as a place to work, in comparison to burnout on Hospital performance.

Methods: This was a panel study of the respondents to the 2012-2019 yearly Staff Surveys of the English National Health Service (NHS) hospital Trusts with hospital performance measured by the adjusted inpatient Summary Hospital-level Mortality Indicator (SHMI).

Results: In univariable regression, all 3 organizational states significantly and negatively correlated with SHMI, with recommendation and engagement showing a nonlinear effect. In multivariable analysis, all three states remained significant predictors of SHMI. Engagement and recommendation showed mutual correlation, with engagement being a more prevalent state than recommendation.

Conclusion: Our study indicates that organizations could benefit from monitoring multiple workforce variables to preserve or enhance workforce well-being, while optimizing organizational performance. The surprising finding that higher burnout was associated with improved short-term performance requires further investigation, as does the finding of less frequent staff recommendation of work compared to staff engagement with their work.

Keywords:

burnout, engagement, job satisfaction, Organizational behavior, health care management

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Introduction

A recent meta-analysis of 62 studies found that positive organizational and workplace cultures are associated with improved patient outcomes across multiple settings and countries.¹ Other studies have focused on burnout and its consequences on individual and organizational performance.² Burned-out clinicians rate safety as a lower priority and clinicians with high emotional exhaustion have higher standardized mortality ratios.³

There is no study of the relative frequency, importance, and interactions of burnout and positive workforce states. In addition to or in lieu of avoiding the negative state of burnout, focusing on attaining the positive organizational states may further increase both organizational performance and job satisfaction.⁴ Data from the United Kingdom's National Health Service (NHS) annual Staff Surveys could be used to address some of these questions.

A key employee state of interest is job satisfaction, defined as "a pleasurable or positive emotional state resulting from the appraisal of "one's job or job experiences".⁵ While the NHS Staff Survey lacks a direct question for job satisfaction, the survey asks whether the respondents recommend their workplace ("recommendation"), which likely captures a positive employee state higher than satisfaction.

A second construct is workforce engagement, defined as "a positive fulfilling, work-related state of mind characterized by vigor, dedication, and absorption".⁶ In a prior study of the NHS, we documented that increases in workforce engagement over the prior year were associated with reductions in Summary Hospital-level Mortality (SHMI).⁷

This study examines NHS workforce engagement, recommendation, and burnout and their relative associations with inpatient mortality as measured by the SHMI.

Methods

We executed a panel study using data from the annual NHS Staff Surveys from 2012-2019 conforming to the STROBE reporting guidelines (Supplementary file, Table I).⁸

As in our prior study⁷, the current study was limited to acute Trusts of the English NHS. English hospitals are the only hospitals in the NHS which track the outcome of interest, the SHMI. Acute Trusts are organizations within the English NHS that include one or more hospitals with autonomy to improve organizational performance.⁷ We again limited our study to acute, non-specialty Trusts because prior studies have indicated that engagement varies by Trust type.⁹ We weighted Trust-level aggregate data by the proportion of clinical care providers represented among the Trust respondents.

The annually fielded NHS Staff Surveys measure workforce well-being, selected respondent and Trust characteristics, and related items. Through 2015, all Trust surveys included all staff if under 600 employees however, if more than 600 staff then only a random sample of staff were surveyed.¹⁰ From 2016, the upper limit for requiring full staff survey was raised to 1,250.¹⁰ Surveys are collected without personal identifying information and aggregated by Trust to ensure respondent privacy protection.

Survey questions representing workforce engagement, recommendation, and burnout are identified by conceptually mapping item content to accepted definitions of the respective organizational states.

We measured workforce engagement with NHS questions 2a, 2b, and 2c, in order, "I look forward to going to work," "I am enthusiastic about my job," and "Time passes quickly when I am working." These questions map to the validated UWES-9 factors: vigor, dedication, and absorption.⁶ "I am enthusiastic about my job" is the exact wording from the Schaufeli UWES-9 framework.⁶ Responses were on a Likert scale, "never," "rarely," "sometimes," "often," and "always." In our prior study, we reported engagement as mean scores.⁷ The National Health Service originally piloted the complete UWES-9 with approximately 50 staff from diverse roles. Due to the length of the UWES-9 embedded in the much larger Staff Survey, cognitive testing of respondents supported reducing the items to one from each dimension of engagement. In addition, two items were reworded for the NHS context and to avoid ambiguousness. For example, "I get carried away when I am working" was felt to be ambiguous for a setting where many staff have to follow protocols".^{9,11,12} For easier interpretation, we now report rates of high engagement. This rate is the average of the rate of responses "often" or "always" vs. otherwise by a Trust's respondents to the three questions.

The NHS does not offer an unambiguous measure of satisfaction, akin to the General Social Survey's "All in all, how satisfied would you say you are with your job" or the American Psychological Association's "All in all, I am satisfied with my job".^{5,13,14} We used the available item representing "recommendation" as an employee state likely higher than satisfaction. We used NHS question 21c, "I would recommend my organization as a place to work" (Likert scale similar to engagement).

We measured workforce burnout using question 11c as a proxy; "During the last 12 months, have you felt unwell as a result of work-related stress?" Respondents

answered “Yes” or “No”. Schaufeli found a strong¹⁵ association (R: 0.66 to 0.74) between burnout and physical stress.¹⁶

Trust performance was measured by SHMI, obtained from NHS digital.¹⁷ SHMI is the ratio between the actual deaths during hospitalization at the Trust and the expected number based on average death rate across English Trusts after adjusting for patient characteristics.

Statistical Analysis

We started with univariable and multivariable linear regression models to test the association between SHMI and three independent variables: workforce engagement, recommendation, and burnout. This analysis enables comparisons with existing studies and identifies employee states suitable for subsequent analysis.

The second stage of analyses used univariable regressions and tested the effects of cross-lagged and splined regressions separately. Cross-lagged analysis leverages the repeated measures over years by using SHMI from the prior year as a baseline for the ensuing year to account for measured and unmeasured Trust characteristics that may confound analyses. This choice to measure well-being and mortality in the same year was based on our prior study that compared different lag periods and found that a lag of a year or less was optimal, consistent with other studies.^{18,19}

Spline analysis allows verification of linearity of the associations of the predictor variables with SHMI. The optimum number of knots was determined by modeling 1 through 7 knots, to identify the model with the highest R^2 . Seven was selected as the maximum to be tested in the final model because the explained variance (R^2) continued

to improve up to 7 knots for each variable showing that the analyses were optimally constrained at this level. Non-linearity of each factor was assessed by using analysis of variance (ANOVA) to compare the explained variance in the spline models with that of linear regression.

In the final selected model, we used multivariable regression with both cross-lagged and spline functions to study the association of each variable with SHMI. The predictor variable was determined significant if its removal significantly ($p < 0.05$) reduced the explained proportion of variance compared to the model with all three factors.

As in our earlier study,⁷ we weighted all regression analyses by the proportion of respondents at each Trust who reported having frequent contact with patients. This weighting reflects the NHS “combined weight” approach.²⁰ The regression equations, using engagement as an example independent variable, are in the Supplementary file, Table II.

Significant findings from the linear analyses were also summarized with a dominance analysis that captures the contribution each significant predictor variable to the total variation in SHMI.²¹ Each variable’s contribution to total variance is its partial R^2 , calculated with the R package dominance analysis.²²

Heterogeneity of organizational states was measured with I^2 , the percentage of total variation across Trusts that is not due to chance,²³ using random effects analysis with the Hartung-Knapp estimator.²⁴ The I^2 value is interpreted as: “0% to 40%: may not be important; 30% to 60%: moderate heterogeneity; 50% to 90%: substantial

heterogeneity; 75% to 100%: considerable heterogeneity”.²⁵ Forest plots and heterogeneity were generated with the R package Meta.²⁶

We used repeated measures data and used each year’s data of a Trust as the unit of analysis using all years that had the data essential for the univariable and lagged spline analyses. Required data were the three workforce measures, number of respondents reporting frequent clinical contact, and SHMI. Observations (years) with missing data on essential variables were dropped from analysis; no data imputation was done for missing data.

All analyses were conducted with R statistical software.²⁷ The data and R code are available at <https://ebmgt.github.io/>.

Results

The total number of participating Trusts with data for at least one workforce state was 1084. The number of Trusts with data available on all three workforce states, number of respondents, and mortality rate, was 146 over the 8 years (Table I). The number of Trusts ranged from 141 in 2012 to 126 in 2019 and these 146 Trusts yielded a total of 1073 observations that contributed to one of more analyses. 1059 Trusts had complete data for multivariable analyses. The median number of respondents per Trust in one year was 1,267 and the total respondents across all years was 1,743,103. The median response rate in a year across all Trusts ranged from 41% in 2015 to 49% in 2012. In the most recent year, 2019, the median response rate across Trusts was 46% (range, 27% to 76%).²⁸ Additional details are in the Supplementary file Table III.

Table I. Characteristics of the workforces in participating English NHS Trusts.

Trusts	146 with complete data for at least one year 1073 total Trust-level data across all years
Mean number of staff responses per Trust	1625 (range: 156 to 7513) Total staff responses across all Trusts and years: 1,743,103
Face-to-face contact with patients	Rate of 'Frequently' 69% (range: 57% to 85%)
Engagement	Mean of rates of 'Often' or 'Always' for three items: dedication, vigor, and absorption 68% (range: 55% to 79%)
Recommendation: recommend job	Rate of 'Agree' or 'Strongly agree' 60% (range: 26% to 81%)
Burnout: felt unwell due to work stress	Rate of 'Yes' 37% (range: 24% to 49%)
* Source: Study survey' technical or guidance documents at https://nhsstaffsurveys.com/	

The median proportion of respondents reporting high engagement was 68% (range: 57-85%), high recommendation of work was 60% (range: 26-81%), and burnout, 37% (range: 24-49%) (Table I).

In univariable linear regression, all three factors were negatively associated with mortality: engagement ($\beta = -0.67$, $P < 0.000$), recommendation ($\beta = -0.34$, $P < 0.000$), burnout ($\beta = -0.40$, $P < 0.000$) (Table II). Adding the cross-lagged function to linear

regression did not change the significance of engagement and recommendation but rendered burnout not significant (not shown).

Table II. Summary of regression analyses for Summary Hospital-level Mortality Indicator (SHMI). Using backwards regression, all three states remained independently significant in a two-factor model

Factor	Univariable linear regression for SHMI	Multivariable spline regression with cross-lag for SHMI
Engagement rate	$R^2 = 0.05$ $\beta = -0.67$ $P < 0.000$	Knots = 2 $P \dagger = 0.309 \ 0.040$
Recommendation rate	$R^2 = 0.08$ $\beta = -0.34$ $P < 0.000$	Knots = 4 $P \dagger < 0.000 \ 0.024$
Burnout rate	$R^2 = 0.02$ $\beta = -0.40$ $P < 0.000$	Knots = 0 (linear) $P \dagger = 0.024 \ 0.039$
<p>Notes: 1084 Trusts with data for at least one workforce state; 1073 Trusts reported proportion of respondents with clinical roles for weighting the regression, and 1059 Trusts reported all states and roles for the final analyses. The Trusts have a mean of 1625 respondents. * SHMI. Summary Hospital-level Mortality Indicator † P-value (ANOVA) for a model with this factor removed compared to a model with all three factors.</p>		

Adding the spline function to linear regression significantly improved the predictive accuracy of engagement and recommendation, with 2 and 4 knots being found optimal, respectively (Figure 1). For burnout, the optimum number of knots was 3, but because spline regression did not improve the results obtained by linear regression (Figure 1), we set the optimal number of knots for burnout to 0 in multivariable spline regression analysis.

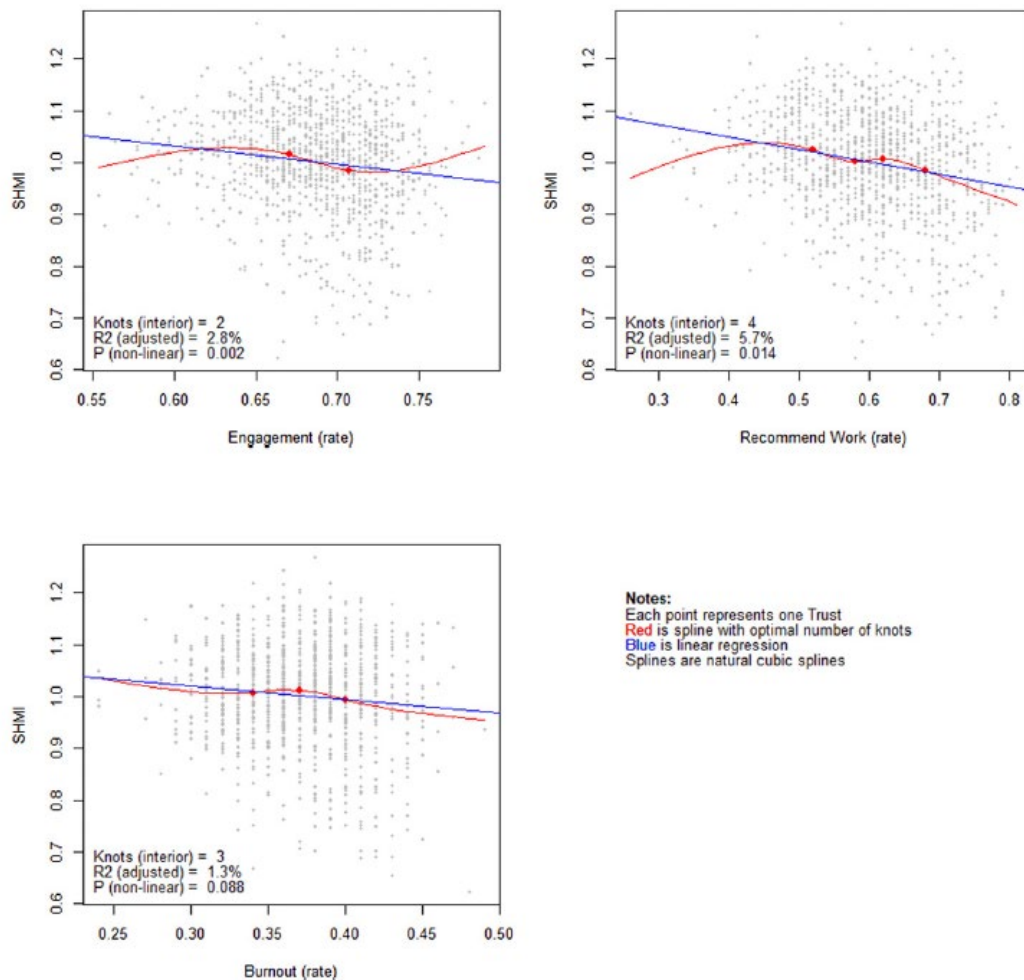


Figure 1 inserted here. Caption: Spline regression testing for non-linearity. This figure excludes cross-lagged regression in order to simplify the display.

In multivariable, cross-lagged, spline regression analysis, using optimal knots as above, all three factors were significant predictors of SHMI although, engagement was of borderline significance (Table II). To explore further, we evaluated the correlation between engagement and recommendation and found them to be highly associated with R² of 41.8% and p-value of < 0.000 (Supplementary file, Figure 1).

Heterogeneity across Trusts on engagement, recommendation, and burnout was at a level defined as “considerable”,²⁵ being 89%, 99%, and 92%, respectively. Forest plots are accessible in Supplementary, file Figure 2.

Discussion

The NHS Staff Survey data from English hospitals, when combined with SHMI data that are maintained separately, present unique sets of data to study staff well-being and patient outcomes. One advantage is that the mean NHS survey response rates (over 40% in every study year) are substantially higher than the rate of 17% in the largest American study of healthcare organizational performance.²⁹ A second advantage is that the broad purview of the Staff Surveys may reduce sensitizing respondents to specific issues such as burnout.³⁰

Our study confirms prior findings while also encountering unexpected findings for previously unstudied hypotheses. As expected, our study indicates that higher workforce engagement and recommendation of one’s workplace are each associated with higher Trust performance measured by in-hospital mortality in univariable analyses. The finding on engagement is consistent with previously documented findings between engagement and organizational performance.^{7,9} The finding regarding the recommendation of workplace is also consistent with a 2019 NHS study showing that workplace recommendation was a strong predictor of clinical research activity and patients’ experiences of care.³¹ While the R^2 values are small, the cross-lagged

regression is a very conservative analysis due to controlling for variables in the prior year.

Unexpected findings in the present study warrant further investigation. First, burnout as measured by work stress, is significantly associated with better performance (lower SHMI) over the short term, when both are measured in the same year. This unexpected negative trend for work stress is consistent with a similar finding on burnout as measured by depersonalization predicting accomplishment by McManus et al.³² In contrast, however, Welp found that emotional exhaustion showed the expected positive association with mortality³.

The intuitively contrarian association of burnout with performance suggests a “burnout paradox.” Our finding may be due to the methodology used: cross-lagged regression with a one-year lag which constrains the analysis to short-term burnout of one year and less. Prior studies without cross lag and repeated measures analysis may be measuring burnout of longer duration. Potentially this paradox may underlie why organizational leaders may be tempted to use transactional leadership strategies to achieve quick improvement in workforce performance in order to achieve immediate and visible improvement in organizational performance in spite of the risk of increasing burnout. Leaders lack “future” data which may show long-term performance deterioration from sustained transactional, directive leadership. It is possible that this paradox may be contributing to the evidence-practice gap in management.³³

The second unexpected finding is in the NHS, engagement was reported more often than workplace recommendation (Table III). NHS data therefore show that some healthcare workers report high engagement concurrent with not recommending their job

to friends. This contradicts the American Psychological Association's (APA) annual Work and Well-Being Surveys in which suggest engagement was less common than the recommendation of one's own workplace.¹⁴ The lower rate of engagement in the APA survey may be, in part, due to different response anchors for the Likert scale as noted in Table III. Further, only 8% of the APA's respondents were in healthcare.¹⁴ Higher engagement in the NHS survey may reflect healthcare employees' perception of an intrinsic meaningfulness of work in healthcare. While this may speak highly of the healthcare workforce and reflect their commitment to, and satisfaction with, their profession, it raises concerns about the organizational environment. While the NHS and APA rates for recommending the workplace are nearly identical, the rate of engagement is higher in the NHS, suggesting that the NHS results for engagement may not generalize outside of the healthcare setting.

Table III. Comparison of the National Health Service (NHS) and American Psychological Association (APA) engagement results.

	American Psychological Association (APA), 2014 ³⁴	National Health Service (NHS), 2019
Population	General American workforce (9% healthcare)	English healthcare
Satisfaction*	70% (Agree/Strongly agree)	Not asked directly in a single question
Recommend work*	57% (Agree/Strongly agree)	60% (Agree/Strongly agree)
Engagement*	40% (Very often/Always response to "I am enthusiastic about my job")	68% (Often/Always response to all three engagement questions)
Notes: * Additional details for the scales are: 1) APA has 6 anchors including 'never'; 2) NHS has 5 anchors including 'never'. The original UWES has seven anchors including 'never' ⁶ .		

A limitation of our study is the lack of data on individual-level responses and the resulting inability to identify latent variable constructs spanning multiple survey items. A related limitation is that the analysis is at the Trust level, and Trusts may manage several separate hospitals which can have different levels of performance and staff well-being. However, it is remarkable that the Trusts were able to exert measurable effect across their hospitals.

A limitation of organizational behavior literature is the inconsistent selection of survey items and scales, as well as inconsistent wording of survey items and selection of Likert scale anchors. For example, the United Kingdom's NHS Survey has specific questions to measure engagement but no questions on overall job satisfaction, whereas in the US, the widely used General Satisfaction Survey (GSS) has specific questions for satisfaction, but not for engagement.¹³ Another limitation of the NHS is the use of physical stress as a proxy for burnout rather than a directly asked question on burnout. However, as mentioned earlier, Schaufeli showed that feeling unwell because of work-related stress is highly correlated with burnout.¹⁶ These differences in survey questions and concepts motivating survey design may tap into different constructs and hamper the portability of findings across studies to build a knowledge base on the organizational management pathways that improve healthcare team performance.

In conclusion, our study shows that the relationships between different workforce states and patient outcomes are complex and nonlinear. Our study supports that efforts to improve workforce well-being may improve healthcare organizational performance. To optimize organizational performance, we need to measure multiple workforce states to

select target variables that would optimize both the organizational mission and workforce well-being. Measurements should be repeated over time to differentiate short-term impacts from the long-term impacts of different workforce states. Heterogeneity in workforce well-being across Trusts suggests an opportunity to share best management practices between Trusts. Further research should compare the impact of short-term vs long-term burnout in workforces.

Declaration of Conflict of Interests

The Authors declare that there is no conflict of interest.

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