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Managing to Stay: Does Line-Manager Quality Affect Employees' Intention to Quit in the NHS?

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ABSTRACT

The English National Health Service (NHS) is one of the largest employers in the world. It is currently suffering from high employee turnover and rising numbers of job vacancies. This article uses five waves of NHS Staff Survey data (2018–2022) to try to understand the relationship between line manager quality and staff intention to quit. It estimates pooled cross-sections with data on close to 400,000 individuals and approximately 130 NHS Trusts. The analysis adjusts for a wide variety of confounding variables, including hospital trust fixed effects. We also check for omitted variables and potential endogeneity. Our econometric estimates point to the important influence that line manager quality has on employees' intentions to quit or stay. This study's novel results suggest that an increase in line manager quality by one unit (on a scale from 1 to 5) is associated with a substantial decrease in NHS employee quit intentions of 17 percentage points.

1 | Introduction

The English National Health Service (NHS) is among the largest employers in the world[1]. It is deemed, more than many comparable healthcare systems, to be struggling to recruit and retain staff (Anandaciva 2023; Garrat 2024). This article draws on data from the NHS Staff Survey. We examine the question: Is there evidence that the quality of NHS line managers influences employees' intention to quit their job?

Fifteen months into World War II, on 4 January 1941, the news magazine *Picture Post* ran with the headline 'A Plan for Britain'. The 1941 Plan called for an end to hunger, better housing and education, social security provision, retirement benefits and 'health for all' through 'a real medical service'. In 1942 the William Beveridge report brought the plan to life, and 3 years after the war, in 1948, the NHS was created.

Now close to eight decades in age, the NHS has until recently been held in the highest esteem by the UK population. The British Social Attitudes survey assessed NHS satisfaction levels over 40 years. In 2010, 7 out of 10 British people expressed high satisfaction with their health service; however, this dropped in March 2024 to fewer than a quarter of the population—the lowest ever recorded level of satisfaction (Jefferies et al. 2024). Most common complaints were long waiting times for general practitioners (GPs) and hospital appointments (71%), and second—arguably the key reason for these delays—staff shortages (54%) (Jefferies et al. 2024). In a King's Fund study examining how NHS performance compares to 19 OECD counties with similar health systems[2], the United Kingdom was found to have fewer doctors and nurses per head than most of its peers (Anandaciva 2023).

Retaining staff has been a problem for the NHS. The Brexit vote in 2016 led to the exit of many European healthcare workers

(Wilson et al. 2021), which in turn led to recruitment drives for doctors and nurses from developing countries (Adepoju 2024). There are currently around 10% vacant posts in the NHS (Nuffield Trust 2024) and, despite an increase in numbers across occupational groups, staff are struggling to meet rising patient demand. The NHS Staff Survey (2024) revealed that 41% of NHS staff reported feeling unwell due to work-related stress, whereas 66% believed their organisations lacked sufficient employees to enable them to perform their roles effectively (Nash 2025).

There is growing awareness of how good management influences organisational effectiveness in the NHS (Veronesi et al. 2019; Jones et al. 2022). Given the limited resources available, combined with staff turnover and the potential impact of so-called quiet quitters (Kang et al. 2023), this article examines the role of line managers (direct supervisors) on employees' intention to quit in NHS hospital trusts. It builds on a growing literature that recognises the influence of leaders and supervisors on employee job satisfaction, retention and performance (e.g., Lazear et al. 2015; Artz et al. 2017; Haile 2023).

The NHS Staff Survey is one of the largest employee surveys available in the United Kingdom. We use data on all employees, including doctors, nurses, allied professionals, administrators and non-clinical managers. We include the years for which information on quit intention is collected, namely, 2018–2022. Our data comprise 275,641 staff in 2018 up to 395,063 staff in 2022. We estimate staff intention-to-quit equations using pooled cross-sections on individuals and taking as our main variable of interest a quality measure of the direct line manager. Quality of management is based on five items that capture the experience of staff with their line manager.

Our study attempts to address the challenges of cross-sectional data in the following way. First, we control for two sets of confounding factors that could affect the individual respondent's intention to quit. We adjust for job characteristics, including the extra-time worked, whether they have the equipment to carry out their job and their satisfaction with pay. Moreover, we control for job-external factors that may add additional strain to employees, such as the condition of their own health (e.g., a long-standing illness [LSI]), and whether they have parental responsibilities or are acting as a carer for family or friends. These potential influences may affect respondents' mood and general contentment with life. Second, we aggregate the measures of line manager quality, job quality, and quit intention (and control variables) to the hospital-trust level and rerun the analysis. Third, we restrict the sample to the occupational category of midwives, where we can identify individuals assessing the same line manager. In addition, we do a final check for the impact of omitted variables and endogeneity on our empirical conclusions by employing the test for coefficient stability using Oster's (2019) method.

Our statistical results suggest that a rise in line manager quality by one unit (on a scale from 1 to 5) reduces the likelihood that an NHS hospital trust employee will quit their job by approximately 17 percentage points. This result appears to be driven in large part by whether the employee perceives his or her work as being valued by the manager, and by whether managers take into consideration employees' opinions. Our results are robust to the inclusion of variables that control for job characteristics and external factors.

The article is organised as follows. Section 2 presents the literature, linking manager quality, job satisfaction, performance and intention to quit. Section 3 presents the NHS Staff Survey data, providing a detailed description of the intention to quit, line manager quality and other relevant variables. Section 3 also presents the empirical specification employed. Section 4 shows the estimated coefficients obtained for the regression for employee intention to quit on line manager quality, and a set of robustness checks. Section 5 discusses the results, contrasting them with existing evidence, and Section 6 presents the limitations of our paper. Section 7 concludes.

2 | Literature Review

2.1 | The Influence of Leaders and Line Managers

As Haile (2023) explains, studies with a focus on leadership and line management are fairly uncommon in the fields of labour economics and industrial relations. However, some of the few exceptions highlight the role of leadership relating to job satisfaction and well-being, as well as productivity (Bloom and Van Reenen 2007; Goodall et al. 2011; Lazear et al. 2015; Bender et al. 2018).

Haile (2023) examined how leadership quality influences organisational performance and worker well-being using two waves of the British Workplace Employment Relations Survey (2004 and 2011). Drawing on various statistical analyses, he found that the quality of a leader is positively associated with leaders' assessments of organisational performance and workers' job satisfaction. Also examining firm productivity, Bender et al. (2018) studied how management practices and workforce selection contribute to firm productivity. Their findings highlight the importance of effective management strategies and careful employee selection in driving organisational productivity. The study, built on earlier work by Bloom and Van Reenen (2007), showed that poor management practices are associated with lower firm productivity. Also within healthcare, good management practices are found to be linked positively to organisational performance, efficiency and patient outcomes (e.g., Bloom et al. 2012; Mei and Kirkpatrick 2019; Veronesi et al. 2019)[3].

Focusing on worker outputs instead of firm performance, a seminal paper analysed the impact of supervisor quality on employee productivity (Lazear et al. 2015). Using data from a large services company, it found that replacing a bad supervisor from the 10th percentile with a supervisor of high quality from the 90th percentile increased productivity by around 13%, which was partly attributed to reduced employee turnover.

An important area of leadership research links manager quality to job satisfaction (e.g., Böckerman et al. 2012; Artz et al. 2017), which in turn is positively associated with worker performance (Isen 2000; Edmans 2012; Oswald et al. 2015; Bryson et al. 2017). Across different industries, Artz et al. (2017) analysed the effect of supervisor competence on various measures of worker well-being. The study found that job satisfaction is higher

when employees are led by managers who have experience and domain expertise in the core business of the organisation in which they are leading. A boss's perceived technical competence was the single strongest predictor of employee job satisfaction. Further studies have continued to show that the quality of one's immediate line manager is empirically a key determinant of job satisfaction (Artz et al. 2017; Bäker and Goodall 2020, 2021). Bryson and MacKerron (2016) looked at how different work activities, possibly assigned by management, affect the happiness levels of employees. The authors used experience sampling methods to capture real-time data on individuals' well-being during various work-related activities, providing insights into which aspects of work contribute most to employee happiness.

There is much less research linking line manager quality to employee intention to quit in the important field of healthcare. One exception, of a different kind from the current study, focuses on clinical expertise as a specific characteristic of line manager quality (Bäker and Goodall 2021). The study includes only medical doctors and shows that having a line manager who is a highly rated clinician is associated with lower intention to quit.

2.2 | Intention to Leave and Actual Quits

Job satisfaction is not only an indicator of worker well-being, and related to productivity, but it is also known to be a predictor of quit rates (e.g., Clark et al. 1998; Clark 2001; Levy-Garboua et al. 2007). An early study by Clark (2001) used quitting behaviour to reveal the aspects of jobs that matter most to employees, highlighting the role of job satisfaction. Of relevance to the findings in this article—because wages in the NHS are centrally determined—Clark found that pay is not the most important factor in job satisfaction or quit decisions. Using the German Socioeconomic Panel data, Levy-Garboua et al. (2007) examined job satisfaction—past and present—to analyse the relationship between the level of satisfaction and actual turnover behaviour as opposed to quit intentions. They found that both current and past job satisfaction levels significantly predict actual quits, with stronger effects at lower satisfaction levels.

Böckerman and Ilmakunnas (2009) examined the links between job disamenities, job satisfaction, quit intentions and actual quits. In line with the previous research, the authors found the impact of job satisfaction on quit intentions to be substantial, and quit intentions were shown to have a strong positive effect on actual quits. A recent study examining gender differences in the effect of job satisfaction on quits found that the relationship is stronger for women than for men, and Millennial women are more likely to leave their jobs compared with Baby Boomer women, even when controlling for job satisfaction (Artz 2021). In summary, studies consistently find a significant negative relationship between job satisfaction and both quit intentions and actual turnover.

With regards to the setting of healthcare and specifically the NHS, where staff shortages in the NHS are particularly persistent and harmful, the same relationship exists between intention to quit and actual quits (Morrell and Arnold 2007; Hann et al. 2011; Wilson et al. 2021). In this setting, job characteristics and socio-demographic factors are associated with employee retention (Moscelli et al. 2024); similarly, organisational factors such as workplace violence have emerged as a significant factor in employees' decisions to leave (Serra-Sastre 2024). Staff engagement, on the other hand, has been linked to improved employee retention (Moscelli et al. 2025). Manager quality has also been identified as a moderating factor in the implementation of non-monetary interventions to improve nurse retention (Moscelli et al. 2023). Although the results of Moscelli et al. (2023) show that interventions relate more strongly to employee retention in a setting with high manager quality, our article differs as we examine the direct effect of line manager quality on quit intention, using a larger battery of line manager quality items, across different NHS occupation groups and using data for five recent NHS Staff Survey waves.

3 | Data and Methods

3.1 | Sample

We exploit information from the NHS Staff Survey in England, which is one of the largest workforce surveys available. Every year between September and November, it collects information about the working experience of all NHS employees on payroll. Questions are asked about the job, the management style of line managers and senior management, well-being at work, organisational factors and some individual characteristics.[4]

The NHS Staff Survey contains very rich survey data allowing scholars to understand the determinants of quit intentions among the NHS healthcare workforce, although it has been rarely used to examine NHS staff turnover (see Serra-Sastre 2024 for an exception). The data used in this study include 5 years of survey information, between 2018 and 2022, when data on intention to quit as reported by NHS staff are available. For the purpose of this article, we focus on staff working in acute hospital trusts.[5]

Our sample encompasses NHS staff from 11 occupational groups, namely, allied health professionals, medical and dental, ambulance, public health, commissioning, registered nurses and midwives, nursing or healthcare assistants, social care, support teams (admin, HR, IT, estates, etc.) and general management. The largest staff groups are nurses and midwives (approx. 29%), administrative staff (approx. 25%) and allied healthcare professionals (approx. 22%). The most common age group spans years 51–65 with roughly 31%, followed by 26% in the age group 41–50 years. Twenty per cent of respondents reported as male, 78% are female and the remaining percentage refers to those preferring to self-describe or not to reveal their gender. Per year, our data encompass between 275,641 NHS staff in 134 hospital trusts (2018) and 395,063 NHS staff in 124 hospital trusts (2022) (see Table A1 in the Supporting Information Appendix).

3.2 | Variables

3.2.1 | Quit Intention

Since 2018, the NHS Staff Survey includes a battery of questions that reflect respondents' job satisfaction and their intention to quit the organisation. The survey specifically gathers these questions grouped under the morale theme and explicitly states

TABLE 1 | Descriptive statistics—Intention to quit and management quality.

	2018		2019		2020		2021		2022	
	Mean	**Std.Dev**	**Mean**	**Std.Dev**	**Mean**	**Std.Dev**	**Mean**	**Std.Dev**	**Mean**	**Std.Dev**
Panel A—Intention to quit:										
Thinking of leaving	0.291	0.454	0.280	0.449	0.263	0.440	0.312	0.464	0.325	0.468
Panel B—Line manager:										
Line manager quality	3.710	0.961	3.747	0.962	3.727	0.977	3.673	1.000	3.707	0.996
Encourages me	3.783	1.020	3.827	1.012	3.806	1.025	3.776	1.039	3.811	1.033
Clear feedback	3.613	1.087	3.655	1.087	3.626	1.099	3.599	1.102	3.637	1.098
Consults me	3.459	1.160	3.488	1.161	3.461	1.178	3.465	1.179	3.502	1.176
My well-being	3.813	1.067	3.852	1.072	3.853	1.086	3.728	1.121	3.760	1.112
Work valued	3.882	1.000	3.914	1.006	3.891	1.022	3.797	1.042	3.825	1.037
Panel C—Senior management:										
Senior manager quality	3.284	0.914	3.316	0.923	3.297	0.928				
Senior manager known	4.046	0.908	4.050	0.915	4.056	0.905				
Effective coms	3.124	1.118	3.160	1.122	3.149	1.138				
Consult on decisions	2.962	1.135	3.006	1.142	2.961	1.155				
Acts on feedback	3.004	1.086	3.046	1.097	3.022	1.107				
Observations	275,641		338,344		353,701		394,754		395,063	
Cronbach α LM	0.943		0.942		0.944		0.950		0.951	
Cronbach α SM	0.875		0.877		0.875					

Note: Intention to quit variable coded as indicator variable equal to 1 if the respondent answered 'agree' or 'strongly agree', and 0 otherwise. Line manager quality is the average of the responses given to the five questions on immediate management quality (encourages me, clear feedback, consults me, my well-being and work valued). The variable on senior management (SM) is based on the average of four questions (senior management known, effective communication, consult on decisions and acts on feedback).

that these reflect each respondent's intention to leave (NHS Staff Survey Coordination Centre 2022). Our focus is on employee quit intentions. The analysis is based on responses to the question: 'To what extent do you agree or disagree with these statements? I often think about leaving this organisation'. Answers are rated on a 5-point Likert scale from (1) strongly disagree to (5) strongly agree. Following Serra-Sastre (2024), we generate a dummy variable (*Thinking of Leaving*) equal to 1 if the respondent agrees or strongly agrees for this item, and 0 otherwise to capture quit intentions. Descriptive statistics for this variable for each sample year are available in Panel A in Table 1.

3.2.2 | Line Manager Quality

We capture line manager quality with all five items on immediate supervisors that are consistently included in the NHS Staff Survey across all 5 years. These are 'To what extent do you agree or disagree with the following statements about your immediate manager': 'My immediate manager (who may be referred to as your "line manager")…' (1) … encourages me at work (*Encourages me*), (2) … gives me clear feedback on my work (*Clear feedback*), (3)… asks for my opinion before making decisions that affect my work (*Consults me*), (4)… takes a positive interest in my health and well-being (*My wellbeing*), and (5) … values my work (*Work valued)*. Respondents scored the items on a 5-point Likert scale from (1) strongly disagree to (5) strongly agree. We compute the mean over all five items, whenever respondents answered at least two of the items, to create the variable *Line Manager Quality*. A higher score of this variable means higher quality. Panel B in Table 1 shows the descriptive statistics of the overall manager quality for each survey year as well as for the individual items. At the bottom of the table, we also show the Cronbach's alphas for line manager quality, ranging from 0.942 in 2019 to 0.951 in 2022 and suggesting high reliability of the items included in the overall measure of line manager quality.

Moreover, assuming that manager quality might trickle down from senior managers to line managers, as a robustness check we also capture the quality of senior managers with four items (only available for the years 2018–2020). These are 'To what extent do you agree or disagree with the following statements about senior managers where you work?': (1) I know who the senior managers are here (*Senior management known*), (2) Communication between senior management and staff is effective (*Effective coms*), (3) Senior management here try to involve staff in important decisions (*Consult on decisions*) and (4) Senior management act on staff feedback (*Acts on feedback*). Respondents scored the items on a 5-point Likert scale from (1) strongly disagree to (5) strongly agree. We compute the mean over all four items, whenever respondents answered at least two of the items and generate the corresponding variable *Senior Manager Quality*. As with the line manager quality variable, a higher score means higher quality of senior management. Descriptive statistics for the senior manager

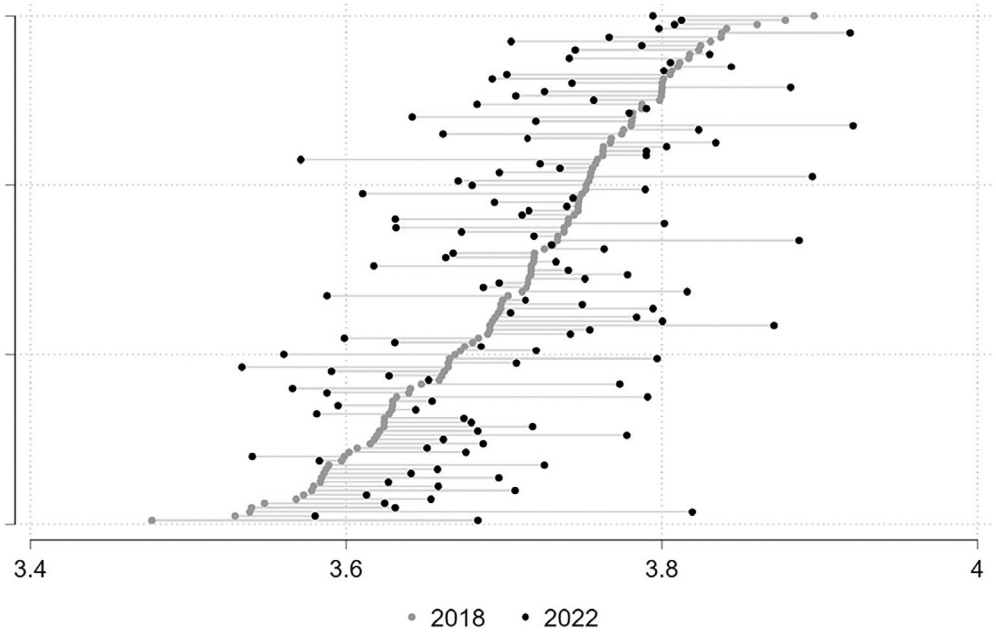

FIGURE 1 | Change in hospital average quality of line management between 2018 and 2022. The graph includes the hospital trusts present in the sample both in 2018 and 2022. The number of hospital trusts in both years is 120.

quality variable and individual items are available in Panel C in Table 1. Cronbach's alphas for senior manager quality range from 0.875 in 2018 to 0.877 in 2019.

In Figure 1, we show the changes in line manager quality between 2018 and 2022. The figure suggests variation in manager quality across hospital trusts. It also highlights that although changes for better and worse were possible for all initial manager quality levels, hospital trusts with higher line manager quality (upper part of Figure 1) tended to get worse, whereas those with worse initial quality tended to improve (lower part of Figure 1).

3.2.3 | Job Quality

We capture *job quality* with all three items on job characteristics that are consistently included in the NHS Staff Survey across all 5 years. These are (1) the number of unpaid extra hours per week, (2) whether the respondent had 'adequate materials, supplies and equipment' to do their job, and (3) satisfaction with the level of pay. For (1), the number of unpaid extra hours, we use dummy variables for the following categories: *1–5 unpaid hours*, *6–10 unpaid hours*, *11+ unpaid hours*, with 0 h as the reference category. For (2) we created a dummy variable equal to 1 if the respondents said they had *Adequate equipment*, and 0 otherwise. Finally, for (3) satisfaction with level of pay (*Satisfied with pay*), which was scored on a 5-point scale from (1) very dissatisfied to (5) very satisfied, we again created a dummy variable equal to 1 if respondents were satisfied or very satisfied, and 0 otherwise. Importantly, manager quality is not linked to satisfaction with pay because line managers do not control wage levels; salaries in the NHS are externally determined by an independent NHS Pay Review Body. Descriptive statistics on job quality are provided in Table 2.

3.2.4 | Control Variables

We include a number of individuals characteristics of the NHS staff, namely, gender, age categories (16–20, 21–30, 31–40, 41–50, 51–65, 66+), ethnicity (White, mixed, Asian/Asian British, Black/Black British, Any other background), a dummy variable for whether they have patient contact and the occupational group. The NHS Staff Survey differentiates 11 occupational groups, namely, allied health professionals, medical and dental, ambulance, public health, commissioning, registered nurses and midwives, nursing or healthcare assistants, social care, support teams (admin, HR, IT, estates, etc.), and general management.

To adjust for confounders that may affect the quit intention of employees, we adjust for a set of job-external factors. Specifically, we control for whether the respondent has an LSI, and whether they have parental responsibilities or are carers for family or friends. Descriptive statistics for individual characteristics and external factor variables are available in Table A1 in the Supporting Information Appendix.

3.3 | Empirical Specifications

We estimate a linear probability model (LPM)[6] to examine the relation between manager quality and quit intention. It is depicted in the following empirical specification:

$$Q_{iht} = \alpha_0 + \alpha MQ_{it} + \beta' X_{it} + \gamma_t + \lambda_h + \varepsilon_{it}. \quad (1)$$

where Q_{iht} is a dummy that indicated if respondent i working in trust h in survey year t intends to leave the organisation; MQ_{it} is the manager quality reported by respondent i at t; X_{it} is a vector of individual characteristics, job quality and external factors (as detailed in the data section above); γ_t is a vector of year fixed

TABLE 2 | Descriptive statistics—Aspects of job quality.

	2018		2019		2020		2021		2022	
	Mean	**Std.Dev**	**Mean**	**Std.Dev**	**Mean**	**Std.Dev**	**Mean**	**Std.Dev**	**Mean**	**Std.Dev**
Unpaid work:										
0 h	0.424	0.494	0.444	0.497	0.452	0.498	0.432	0.495	0.440	0.496
1–5 h	0.445	0.497	0.435	0.496	0.422	0.494	0.430	0.495	0.428	0.495
6–10 h	0.093	0.290	0.087	0.281	0.089	0.285	0.098	0.297	0.094	0.291
11 or more hours	0.038	0.190	0.035	0.183	0.036	0.186	0.040	0.196	0.038	0.191
Adequate equipment	0.534	0.499	0.546	0.498	0.586	0.493	0.553	0.497	0.534	0.499
Satisfied with pay	0.363	0.481	0.379	0.485	0.363	0.481	0.321	0.467	0.250	0.433
Observations	275,641		338,344		353,701		394,754		395,063	

Note: Job quality as captured by the number of unpaid hours per week (0 h, 1–5 h, 6–10 h, 11 or more hours), having adequate materials, supplies and equipment to do the job and satisfaction with level of pay.

effects; λ_h is a vector of hospital fixed effects; and ϵ_{it} is the error term *i.i.d.* distributed. In our empirical specifications, we cluster the standard errors at the hospital trust level.

Our baseline specifications control for a wide range of individual demographics, job quality and other external factors that may affect quit intentions of the workforce. Yet, the point estimates could be biased if there remain unobserved characteristics that affect both quit intention and manager quality. We use the methodology proposed by Oster (2019) to assess the bias arising from unobserved heterogeneity. Oster's test links coefficient stability to the observed movements in the *R*-squared. The lower bound is given by the estimate from the controlled regression (that includes all observed characteristics). The upper bound is determined by the bias-adjusted coefficient of our main variable of interest, manager quality, approximated as

$$\alpha^* \approx \tilde{\alpha} - \delta\left[\dot{\alpha} - \tilde{\alpha}\right]\frac{R_{\max} - \tilde{R}}{\tilde{R} - \dot{R}}$$

where $\tilde{\alpha}$ is the estimated coefficient and $\tilde{R}$ is the *R*-squared of the regression including all controls; and $\dot{\alpha}$ and $\dot{R}$ are the coefficient and *R*-squared of the unrestricted regression with no control variables. Oster (2019) shows that α^* converges to the true α. To determine this bias-adjusted coefficient α^*, two parameters play a crucial role: δ and $R_{\max}$. For the latter we used the value $R_{\max} = \min[1.3\tilde{R}, 1]$, as suggested by Oster (2019). The symbol δ is the coefficient of proportionality, indicating the relative importance of unobservables compared to observables. Oster (2019) suggests 1 as an appropriate value for δ; however, we present bounding sets under different values for δ.

4 | Results

4.1 | Baseline Results on the Relationship Between Line Manager Quality and Quit Intention

In Table 3, Column (1) shows the results on the association between line manager quality and quit intention. The specification includes controls for gender, age, ethnicity, patient contact, and occupational group. The point estimate in Column (1) indicates that line manager quality is associated with reduced staff quit intention. An increase in manager quality by one unit (on a scale from 1 to 5) decreases quit intention by 0.17. That is, the likelihood to quit is reduced by 17 percentage points.

TABLE 3 | Regression results for employee intention to quit on line manager quality.

	Intention to quit		
	(1)	**(2)**	**(3)**
Line manager quality	−0.1694***		
	(0.0006)		
Above average quality		−0.2748***	
		(0.0018)	
Encourages me			−0.0284***
			(0.0008)
Clear feedback			−0.0208***
			(0.0007)
Consults me			−0.0442***
			(0.0006)
My well-being			−0.0174***
			(0.0007)
Work valued			−0.0591***
			(0.0007)
Observations	1,757,503	1,757,503	1,743,440
R^2	0.151	0.108	0.153
Controls	Yes	Yes	Yes
Trust FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note: Sample used covers the period for 2018–2022. Controls included are age (in bands), gender, patient contact, ethnic group and staff occupational group. Reference categories for gender is male, for age is age band 16–20, for ethnicity is White, and for occupational group is allied health professionals. Standard errors clustered at the hospital trust level. Significance levels: $+p < 0.10$, $**p < 0.05$, $***p < 0.01$.

This coefficient is estimated using LPM. Employing probit model yields similar results, as shown in Table A2 in the Supporting Information Appendix, where marginal effects of the association between manager quality and intention to quit are provided.

To understand the relative position of each individual respondent's assessment of line manager quality (with respect to the average quality in the hospital trust), we generate a dummy that indicates if reported manager quality by respondent is above the average quality for the respective hospital trust-year pair. We present these results in Column (2) in Table 3. Again, we see a consistently negative relationship between assessing manager quality as above average (compared to other colleagues within the trust and for a given year) and quit intention. Individuals with an above average quality line manager are 27% less likely to think about leaving the organisation. Column (3) shows the results when using the individual items that capture line manager quality instead of the composite. Each variable can take values between 1 (strongly disagree) and 5 (strongly agree). Most notably, recognition for work (Work valued) is the aspect of manager quality with the strongest relationship to quit intention. This is followed by managers consulting staff on decisions that affect their work (Consults me), and all other aspects of management having a similar association with intention to quit.

Columns (1) and (2) of Table 3 use the variable for line manager quality computed if at least two of the items were answered. If we exploit instead the sample for those who answered all items and replicate Table 3, the analysis yields the same results (see Table A3 in the Supporting Information Appendix). Table A4 in the Supporting Information Appendix shows the estimated coefficients for all included controls in addition to line manager variables.

Given that nearly three quarters of the workforce in the NHS Staff Survey data are female we investigate whether the results are sensitive to gender differences or care responsibilities. We estimate the regressions by (1) gender, (2) whether respondents have care responsibilities (regardless of gender), (3) for women with/without care responsibilities, and (4) for women of childbearing age (see Table A5 in the Supporting Information Appendix). The results show that the negative link between line manager quality and quit intention continues to hold across all specifications. The differences in coefficients between men (Table A5 Column 1) and women (Table A5 Column 2) are marginal, suggesting that our finding is not driven by the gender composition of our sample.

Our sample period covers the outbreak of the COVID-19 pandemic. To assess whether the pandemic may have affected our results we also check that the relationship between line manager quality and intention to quit was not significantly changed by the pandemic. We include the regression findings in Table A6 in the Supporting Information Appendix. The table presents four sets of results. Column (1) shows estimates for the pre-pandemic period, whereas Column (2) reports results for the post-pandemic period, allowing for a descriptive comparison across time. Column (3) employs the difference-in-differences (DiD)[7] method to estimate the impact of the pandemic, leveraging an interaction term between a post-pandemic dummy variable and a dummy variable for above average managerial quality. Finally, Column (4) interacts the post-pandemic dummy variable with the continuous treatment measure of line manager quality. The estimated coefficients in Columns (1) and (2) are virtually the same. The interaction term in Column (3) is negative but small in absolute terms, suggesting that after the pandemic those with above average line manager quality were slightly less likely to quit. However, the interaction term in Column (4) suggests that there is no significant effect of the pandemic on the relationship between line manager quality and quit intention.

We further analyse the impact of senior manager quality on intention to quit. Table A7 in the Supporting Information Appendix shows the regression results for overall senior manager quality and the individual items used to capture senior manager quality. The result of a negative link between line manager quality and quit intention also holds when using senior manager quality instead of line manager quality. From the individual questions we can also conclude that positive engagement of senior managers with staff reduces intention to quit, in line with findings by Moscelli et al. (2025) on actual quit rates.

4.2 | Line Manager Quality or Job Quality?

Next, we include job quality variables in the equations with the aim of distinguishing between the consequences of good managers and of good jobs. Table 4 shows the results. Of note, the estimated coefficients of manager quality when accounting for job quality shown in Column (2) is similar to those found in our baseline estimation in Column (1) in Table 3, also included in Table 4 Column (1) for convenience. Hence, our previous estimates seem not to be driven by job quality artificially inflating our estimations for line manager quality. An increase in manager quality is related to a decrease in quit intention over and above the inclusion of our controls for job quality. In contrast, working un-paid hours is positively associated with an employee's quit intention, and the strength of this relationship increases as the number of weekly extra hours worked rises without additional remuneration. The negative coefficient on the adequate equipment variable suggests that good supplies and adequate equipment are associated with reduced employee quit intention. Similarly, higher employee satisfaction with pay is negatively related to employee quit intention. The importance of manager quality over and above job quality is robust to excluding pay satisfaction (see Table A8 in the Supporting Information Appendix, Column (2)).

4.3 | Robustness Checks

The anonymous nature of the NHS Staff Survey prevents us from turning the cross-sectional survey waves into a panel. It is important, therefore, to carefully check that NHS employees' assessment of the quality of their line manager, and their own intention to quit is not driven by omitted variables, for example, a worker's mood and general disposition. Thoughts about leaving and thoughts about one's line manager might be related to pressures outside work. This could create an artificial estimated relationship between line manager quality and quit intention.

TABLE 4 | Regression results for employee intention to quit on line manager quality—Controlling for job quality.

	Intention to quit	
	(1)	(2)
Line manager quality	−0.1694***	−0.1455***
	(0.0006)	(0.0006)
1–5 unpaid hours		0.0517***
		(0.0010)
6–10 unpaid hours		0.0930***
		(0.0020)
11+ unpaid hours		0.1127***
		(0.0022)
Adequate equipment		−0.1028***
		(0.0012)
Satisfied with pay		−0.0932***
		(0.0013)
Observations	1,757,503	1,757,503
R^2	0.151	0.181
Controls		Yes
Trust FE	Yes	Yes
Year FE	Yes	Yes

Note: Sample used covers the period for 2018–2022. Column (1) includes the variable on liner manager quality. Column (2) adds job quality characteristics: dummies for range of unpaid hours worked (reference category is 0 h unpaid work), having adequate equipment for doing the job and satisfaction with pay. All regressions include controls for individual characteristics—see notes in Table 3 for a list of these control variables. Standard errors clustered at the hospital trust level. Significance levels: $+p < 0.10$, $**p < 0.05$, $***p < 0.01$.

We take five separate steps to try to address this potential omitted variable bias. First, we control for variables unrelated to work, such as an employee's own health and whether they have caring obligations that might affect a respondent's mood. Second, we aggregate the measures of line manager quality, job quality and quit intention (and control variables) to the hospital-trust level for each year and rerun the analysis. Third, we exploit the fact that for the occupational category of midwives we can identify those individuals who assess the same line manager. Thus, we rerun the analysis for midwives only, but instead of relating own assessment of manager quality to own quit intention, we relate the average manager quality assessed by coworkers to midwives' quit intention. Fourth, we assess the impact of omitted variables on our empirical conclusions using the test for coefficient stability proposed by Oster (2019). Finally, we run additional checks on the stability of our results, accounting for trust size and occupational composition and accounting for group-level unobserved heterogeneity.

4.3.1 | Accounting for External Factors (Unrelated to Work) to Capture Mood Effects

In this section, we include variables that proxy external factors outside the work environment to control for characteristics that could lower respondents' mood,S affect their quit intention and possibly also their assessment of manager quality. The NHS Staff Survey does not include numerous questions about life outside work; however, some important potential influences are available. We add variables related to a respondent's own health—whether they have a LSI—and a variable identifying any caring responsibilities, either for children or members of the family or others. The variables on caring responsibilities are only available for the years 2020–2022. Hence Table 5 presents the results of the regression using the sample for this time frame. Table 5 includes the estimations for line manager quality only (Column 1) and for line manager quality and job quality (Column 2) for comparison (given that we use a different time frame in this robustness check), and the results adjusting for external factors (Column 3) and including both job characteristics and external factors (Column 4).

Our findings in Column (3) show that adjusting for external factors that could influence quit intention (captured by health condition and caring obligations) does not change the negative significant relationship between the quality of a line manager and quit intention. This is further supported by the results that include controls for job characteristics (Column 4). Moreover, to address the issue of missing data in key covariates, we generate an additional category within each variable for those observations that have a missing value. Results are presented in Table A9 in the Supporting Information Appendix and indicate that our results continue to hold.

4.3.2 | Aggregation to the Hospital Trust Level

As a second robustness check, we aggregate the data to the hospital trust level, yielding one observation per trust per year, thus creating a panel of hospital trusts. We then rerun the analysis to examine the effect of average line manager quality per trust on average quit intention per trust. The results are presented in Table 6. They include the results when adjusting for job characteristics and external factors that may affect mood. The estimations including variables that could potentially affect mood (factors unrelated to work) use data for the years 2020–2022. As might be expected, all variables capturing individual differences lose significance when aggregating to the trust level. For instance, categories of unpaid overtime, individual health conditions and care obligations do not relate to average quit intention per trust. However, line manager quality and adequate equipment as well as sufficient pay continue to negatively and significantly relate to quit intention levels per trust.

4.3.3 | The Subsample of Midwives: Using Coworker Assessment of Line Manager Quality

Next, to address potential single-rater bias, we use coworker ratings of manager quality instead of own ratings and relate these to respondents' quit intention. This analysis addresses endogeneity by ruling out the possibility that unobserved individual characteristics simultaneously drive both manager quality assessments and quit intentions, thereby preventing a spurious relationship between the two. Ideally, we would use coworker ratings of one's manager instead of own ratings for our main sample. However, the design of the NHS Staff Survey, which asks

TABLE 5 | Regression results for employee intention to quit on line manager quality—Controlling for external factors.

	Intention to quit			
	(1)	**(2)**	**(3)**	**(4)**
Line manager quality	−0.1696***	−0.1456***	−0.1668***	−0.1441***
	(0.0007)	(0.0007)	(0.0007)	(0.0007)
1–5 unpaid hours		0.0535***		0.0512***
		(0.0011)		0.0011)
6-10 unpaid hours		0.0966***		0.0942***
		(0.0021)		(0.0021)
11+ Unpaid hours		0.1161***		(0.1146***
		(0.0027)		(0.0027)
Adequate equipment		−0.1058***		−0.1031***
		(0.0013)		(0.0013)
satisfied with pay		−0.0912***		−0.0878***
		(0.0015)		(0.0015)
Own health			0.0729***	0.0620***
			(0.0013)	(0.0013)
Children			−0.0164***	−0.0145***
			(0.0012)	(0.0012)
Carer responsibilities			0.0344***	0.0233***
			(0.0012)	(0.0011)
Observations	1,120,019	1,120,019	1,120,019	1,120,019
R^2	0.156	0.186	0.162	0.189
	Yes	x	Yes	Y
Trust FE	Yes	Yes	x	Yes
Year FE	Yes		Yes	x

Note: The sample used in regressions is restricted to 2020–2022, the period when carer variables are available. Using the restricted sample 2020–2022, we replicate the models displayed in Columns (1) and (2) in Table 4 for comparability. Columns (2) and (4) include job quality characteristics: dummies for range of unpaid hours worked (reference category is 0 h unpaid work), having adequate equipment for doing the job and satisfaction with pay. Regressions in Columns (3) and (4) include external factors: respondent's health, whether respondent has children aged 0–17 and whether they have carer responsibilities. All regressions include controls for individual characteristics—see notes in Table 3 for a list of these control variables. Standard errors clustered at the hospital trust level. Significance levels: $+p < 0.10$, $**p < 0.05$, $***p < 0.01$.

for occupational groups but not clinical specialisation within the occupational group, makes identification of coworkers assessing the same line manager difficult.

Midwives is the only group for which the affiliation with a trust and the information on occupational group is sufficient to know that these are direct coworkers, reporting on the same line manager. Because trusts may have several sites providing maternity care, we restrict the sample to those trusts that only have a single location or that have multiple sites but only one providing maternity care. Hence, we re-run our analysis for this important occupational group of midwives. Midwifery, which provides specialised care for birthing mothers, has particularly struggled with low staffing numbers[8]. This has generated complaints about unsafe practices, which has prompted more midwives to leave the NHS[9]. To address the potential concern that midwives have a substantial different relationship between manager quality and intention to quit, we provide results on the link between manager quality—controlling for job quality and work-unrelated factors—and quit intention by occupational groups, using the years 2020–2022 to be able to include our potential mood-affecting variables (see Table A10 in the Supporting Information Appendix). The group midwives shows similar patterns as other occupational groups, and for each occupational group, we see that manager quality relates negatively to intention to quit.

In Table 7, we consider four different measures of line manager quality in midwifery: (1) the standard variable used in the above analysis, that is, the score for quality of manager as indicated by each midwife themself; (2) the average for midwives per trust and year (*Average quality*); (3) the difference (*Diff in quality*) between each individual response and the average for midwifery for each trust-year; and to address the issue of endogeneity caused by a single-rater bias (4) average coworker assessment of line manager quality, excluding own assessment (MQ_{-i}). The model specifications include job quality measures next to standard control variables (using the sample for the years 2020–2022).

TABLE 6 | Regression results for employee intention to quit on line manager quality—Aggregated responses by hospital and year.

	Intention to quit		
	(1)	(2)	(3)
Line manager quality	−0.3216***	−0.1939***	−0.1552***
	(0.0204)	(0.0245)	(0.0443)
1–5 unpaid hours		0.0692	−0.0778
		(0.0728)	(0.1093)
6–10 unpaid hours		0.1161	0.1748
		(0.1265)	(0.2006)
11+ unpaid hours		−0.0693	−0.3208
		(0.1948)	(0.3183)
Adequate equipment		−0.2511***	−0.3605***
		(0.0373)	(0.0721)
Satisfied with pay		−0.1891***	−0.1624**
		(0.0588)	(0.0807)
Own health			0.0997
			(0.1401)
Children			0.1788
			(0.1467)
Carer responsibilities			0.0863
			(0.0954)
Observations	645	645	378
R^2	0.913	0.930	0.956
Controls	Yes	Yes	Yes
Job characteristics	No	Yes	Yes
External factors	No	No	Yes
Trust FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note: All variables have been collapsed at the hospital and year level. Regressions for time period 2018–2022, except for regression in Column (3) which includes variables on carer responsibilities that are available for the years 2020–2022 only. Column (1) includes job quality characteristics: dummies for range of unpaid hours worked (reference category is 0 h unpaid work), having adequate equipment for doing the job and satisfaction with pay. Column (3) also includes external factors: respondent's health, whether respondent has children aged 0–17 and whether they have carer responsibilities. Estimates presented are for pooled linear regression. All regressions include controls for individual characteristics—see notes in Table 3 for a list of these control variables. Standard errors clustered at the hospital trust level. Significance levels: $+p < 0.10$, $**p < 0.05$, $***p < 0.01$.

Compared with self-assessed line manager quality in Column (1), coworker-assessed manager quality, in Column (4) has a similarly strong relationship with midwives' intention to quit. As with the previous robustness checks, this illustrates that our main findings seem not to be driven by unobservable, individual-level variables. Instead, manager quality seems to strongly relate to quit intention even when ruling out a single-rater bias by using average manager quality rated by coworkers and excluding own ratings of manager quality.

4.3.4 | Coefficient Stability

Our fourth check to assess the impact of omitted variables presents the bounding sets generated using Oster's (2019) approach. Table 8 presents the bounding set, based on the estimates for the controlled regression shown in Column (1) of Table 3, including only individual respondent characteristics. The lower and upper bounds for the identified set are very close, indicating that omitted variable has a negligible effect. $\alpha^* - \tilde{\alpha}$ shows the magnitude of bias, which ranges between 0.0012 and −0.004. The bounding set shows that there is no change in sign and hence the presence of minimal bias does not change the direction of the effect. The bottom panel of Table 8 shows the results of the Oster test for the specification that includes both job characteristics and external factors (as in Column (4) of Table 5), with similar conclusions. The Oster test is reassuring for our analysis, indicating that omitted variables are unlikely to have a major effect on our baseline estimates.

4.3.5 | Additional Checks

As final robustness test, we run additional checks. We first consider how group-level heterogeneity may affect our results. Although our estimates control for occupational group, there may be differences in unobserved characteristics at the staff group level that may bias our results. To assess the potential impact this may have, we parameterise the hospital fixed effect accounting for occupational staff group heterogeneity within each hospital trust, following the approach proposed by Mundlak (1978) and Arkhangelsky and Imbens (2024). Table A11 in the Supporting Information Appendix shows the estimates, replicating the models presented in Tables 4 and 5. Panel A shows the case of parameterising the hospital-trust fixed effect using the staff group average of manager quality only, and Panel B shows the results for the case of parameterising the hospital-trust fixed effects using the staff group average of manager quality and all other variables (individual controls, job characteristics and external factors). Overall, the results are very similar to our main estimates (shown in Tables 4 and 5).

To account for differences in size and staff composition across hospital trusts, we also use weights to allow for the comparisons of line manger quality and other variables across organisations of similar characteristics. Details on the computation of these weights are available in the survey technical reports (see, e.g., the Technical Guide to the 2020 Staff survey Data[10]). We apply the combined weight, including both the occupational and trust size weights, again replicating the models estimated in Tables 4 and 5. Results are available in Table A12 in the Supporting Information Appendix and show minimal changes in the estimates compared to our baseline estimates in Tables 4 and 5.

5 | Discussion

Consecutive independent NHS reviews—from Ara Darzi's 'High quality care for all' (2008) to Stuart Rose's 'Better leadership for tomorrow' (2015) and Gordon Messenger's 'Health and social care review' (2022) and again back to Ara Darzi's recent 'Independent

TABLE 7 | Regression results for midwives' intention to quit on line manager quality.

	Intention to quit			
	(1)	(2)	(3)	(4)
Line manager quality	−0.133***			
	(0.0041)			
Average quality		−0.242***		
		(0.0291)		
Diff in quality			−0.129***	
			(0.0045)	
MQ_i				−0.158***
				(0.0341)
Observations	22,604	22,604	22,604	22,604
R^2	0.180	0.121	0.176	0.118
Controls	Yes	Yes	Yes	Yes
Job characteristics	Yes	Yes	Yes	Yes
Trust FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Note: Controls for individual characteristics (see notes in Table 3 for list of other control variables) and job characteristics: (having adequate equipment to carry out job, number of unpaid hours and satisfied with level of pay). These coefficients not reported here for parsimony. Standard errors clustered at the hospital trust level. Significance levels: $+p < 0.10$, $**p < 0.05$, $***p < 0.01$.

TABLE 8 | Test of coefficient stability—Line manager quality.

Controlled model with:	Δ	$\mathring{\alpha}$	$\mathring{R}$	$\tilde{\alpha}$	$\tilde{R}$	$R_{\max}$	α^*	Identified set
Individual characteristics	1	−0.1699	0.1335	−0.1695	0.1510	0.1963	−0.1682	[−0.1695, −0.1682]
	0.5	−0.1699	0.1335	−0.1695	0.1510	0.1963	−0.1688	[−0.1695, −0.1688]
	0.2	−0.1699	0.1335	−0.1695	0.1510	0.1963	−0.1692	[−0.1695, −0.1692]
All controls	1	−0.1706	0.136	−0.1441	0.189	0.246	−0.1157	[−0.1441, −0.1157]
	0.5	−0.1706	0.136	−0.1441	0.189	0.246	−0.1299	[−0.1441, −0.1299]
	0.2	−0.1706	0.136	−0.1441	0.189	0.246	−0.1384	[−0.1441, −0.1384]

Note: $R_{\max} = \min [1.3\,\tilde{R}, 1]$. Bounding set presented for different values of δ. Uncontrolled regression includes line manager quality variable only. The top panel shows the test where the controlled regression includes individual characteristics only (age, gender, patient contact, ethnic group and staff occupational group). The bottom panel shows the test where the controlled regression includes individual characteristics, job characteristics and external factors (age, gender, patient contact, ethnic group and staff occupational group, unpaid hours, adequate equipment, satisfied with pay, respondent's own health, whether respondent has children aged 0–17 and whether they have carer responsibilities). External factor variables only available for the years 2020–2022; hence results shown in the bottom panel regressions are for this period.

investigation of the NHS in England' in 2024—*all* have highlighted a need for improved leadership and management within the NHS. Similarly, the Francis Inquiry (2013), which examined one of the worst NHS failures of care at Mid Staffordshire NHS Foundation Trust, again focused on the role of poor leadership. The evidence in this article suggests poor line management is a problem for the NHS as it produces employee quit intentions—at a time when the health service is suffering its greatest ever staff shortages.

Our article's finding contributes to a growing body of literature in industrial relations and economics that places emphasis on the important role of leaders and managers in organisations (e.g., Bloom and Van Reenen 2007; Goodall et al. 2011; Lazear et al. 2015; Gibbons and Roberts 2015; Haile 2023). The article also builds on research examining the role of leadership and line management specifically in the field of healthcare. One such study by Veronesi et al. (2019) challenges the common perception that public sector managers are inefficient 'bureaucratic burdens'. To do this they examine the relationship between manager-to-staff ratios and organisational performance in 150 English public hospitals by using longitudinal data from 2007–2012. The researchers find that higher proportions of managers relative to frontline staff improve hospital performance on key metrics like reduced wait times and improved care quality.

A body of related research examines the links between hospital performance and clinical leadership. An early cross-sectional study found that hospitals led by physician CEOs had approximately 25% higher quality scores in US News and World Report

rankings (Goodall 2011). This finding was further supported by Tasi et al. 2019, which concluded that physician-led hospitals had higher quality rankings and operational efficiency, with no significant differences in financial performance. The Sarto and Veronesi (2016) review of 18 studies found consistent evidence supporting physician leadership's positive impact on hospital performance across multiple metrics.

The current study raises important policy implications for the NHS and healthcare management. The NHS Long Term Workforce Plan[11] recognises that more needs to be done to support employees in their job. Our finding that line manager quality substantially affects employee intention to quit suggests the need for considerably more investment in management training, development and selection. Rather than focusing solely on centrally determined pay, NHS hospital trusts could prioritise improving line management capability as a key staff retention strategy. Such a positive effect on staff retention is potentially supported by review articles that identify significant outcomes from leadership development programmes, such as improved knowledge, motivation, skills, behaviour change, staff retention and patient-level outcomes (Geerts et al. 2020; Lyons et al. 2020).

A second policy suggestion is to include manager quality metrics in NHS performance assessments. This could help identify the trusts that need additional support—in training and supporting managers. These implications are particularly relevant given current NHS difficulties with staff retention and recruitment, especially post-Brexit and post-pandemic. Our findings suggest that improving manager quality could be a cost-effective way to address staff retention challenges when wage increases are constrained by central policy.

6 | Limitations

While providing valuable insights into the relationship between NHS line manager quality and employee quit intentions, our study has limitations. First, the anonymous nature of the NHS Staff Survey prevents the creation of a true panel dataset, which limits our ability to track changes over time for individual employees. A second potential weakness is the use of subjective employee ratings of manager quality, and of self-reported quit intentions, rather than of actual data on worker quits. However, a strong predictive relationship between quit intention and actual turnover behaviour is consistently reported in the literature (e.g., Sousa-Poza and Henneberger 2004; Böckerman and Ilmakunnas 2009; Hom et al. 2017), somewhat relieving concerns about using quit intention as our outcome measures. Third, the survey data include only respondents who have stayed in their NHS hospital trust. The coefficient of interest may be influenced by survivorship bias, as the sample does not account for individuals who have already exited the organisation. Although no explicit correction for potential selectivity bias is applied due to the difficulty in defining a suitable instrument, this limitation should be considered when interpreting the results. Fourth, only in the subsample of midwives it is possible to have multiple workers' assessments of the same individual manager, which there helps address a potential common method and single-rater bias. Finally, the analysis is based on a dataset spanning 5 years, which constitutes a relatively short time dimension (T). This limited temporal coverage might bias the estimation of the hospital trust fixed effects and the coefficient on management quality.

7 | Conclusion

This study is an attempt to understand the role of line managers in the English NHS. It finds a consistent inverse relationship between line manager quality and employee quit intentions. A one unit increase in line manager quality (on a 5-point scale) is associated with a decrease in NHS employee quit intention of 17 percentage points.

This relationship remains robust across multiple specifications, use of coworker assessments of manager quality (to control for single-rater bias) and when controlling for external variables such as employee health and job quality factors, namely, pay satisfaction, adequate equipment and unpaid overtime hours.

At a time when the NHS is struggling with its performance, and particularly with staff retention, we contribute to the literature and shed light on the strong link between manager quality and staff intention to quit in the healthcare sector.

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Ethics Statement

The authors have nothing to report.

Conflicts of Interest

The authors declare no conflicts of interest.

Endnotes

[1] https://www.nuffieldtrust.org.uk/resource/the-nhs-workforce-in-numbers.

[2] Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Portugal, Spain, Sweden, United Kingdom, United States.

[3] One study finds no evidence of this relationship (see Asaria et al. 2022).

[4] On average around 50% of NHS staff respond to the NHS Staff Survey annually.

[5] Acute trusts are hospitals providing non-specialised secondary care to patients.

[6] LPM are commonly used to estimate models with binary dependent variables, providing computational efficiency and importantly to ease interpretation allowing to assess the direction and magnitude of effects (Angrist and Pischke 2009). In Section 4, we will provide estimates using LPM but include Table A2 in the Supporting Information Appendix for the results of using a probit model, to confirm the similarity of results.

[7] DID methods rely on two key assumptions. First, the parallel trends assumption states that, in the absence of the intervention, the average outcomes of the treatment and control groups would have a similar evolution. Figure A1 in the Supporting Information Appendix shows the trends in intention to quit for those above and below average quality of management, suggesting trajectories pre-pandemic were similar.

Second, the no anticipation assumption requires that individuals do not change their behaviour in advance of the intervention. This plausibly holds given the onset of the pandemic was unexpected.

[8] https://hansard.parliament.uk/Commons/2024-01-23/debates/E29488EA-C614-4E2F-834E-BE1A9DB664ED/MidwiferyAndMaternityServices

[9] https://www.bbc.co.uk/news/health-67732916.

[10] https://www.nhsstaffsurveys.com/static/46d36a39605945922b852508ac2ea602/NHS-Staff-Survey-2020-Technical-document-V2.pdf.

[11] https://www.england.nhs.uk/long-read/nhs-long-term-workforce-plan-2/.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.

Supporting File 1: bjir70023-supp-0001-Appendix.docx