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Workplace violence and intention to quit in the English NHS

Victoria Serra-Sastre^{a,b,c,1,*}

^a Department of Economics, City, University of London, UK

^b Department of Health Policy, London School of Economics and Political Science, UK

^c Office of Health Economics, UK

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ABSTRACT

NHS job vacancies remain at record levels and an increasing number of staff are leaving the NHS. Work-related violence is an aspect that has received little attention as a possible driving force in dropout rates among NHS workforce. Recent figures indicate that approximately 15% of NHS staff had experienced physical violence while at work (NHS Staff Survey, 2022). Given the prevalence of abuse and the consequences it may have on staff wellbeing, we examine the impact of workplace violence on intention to quit the organisation. We employ data from the NHS Staff Survey, a rich dataset that records the experience and views of staff working in the NHS. We use data from 2018 to 2022 of NHS employees surveyed in all NHS acute hospitals, with a sample size of 1,814,120 observations. We study the impact of experiencing physical or verbal violence in the workplace on the intention to quit the organization, examining differences according to perpetrator type. Our analysis also sheds light on any aggravated effect the pandemic had on intention to leave for those exposed to violence. The results suggest that experiencing physical violence increases the intention to leave by 10 percentage points. The effect of verbal violence is quantitatively greater in magnitude, increasing intention to leave by 21 percentage points. Violence from managers has the largest detrimental effect, followed by exposure to violence from multiple perpetrators and violence from colleagues. Heterogeneous effects exist according to occupational group, gender, age and ethnicity. The pandemic only had a marginal contribution to these effects. Staff health, trust in management and quality of patient care are some of the possible mechanisms through which violence influences the intention to quit. Overall, the results suggest that targeted interventions are needed to improve retention after exposure to violence.

1. Introduction

The most recent NHS Staff Survey in 2022 revealed that approximately 15% of staff had experienced physical violence in the previous 12 months and this is a figure that has remained relatively unchanged since 2015. Similarly, the percentage of staff who experienced harassment, bullying and abuse was as high as 40% for the same year. Although aggression from patients remains the largest source of abuse, there is also evidence that managers and colleagues may also become violent towards their peers. The latest available data published by the Health and Safety Executive (HSE), the regulator for health and safety at work, on work-related violence for the wider economy indicates that 1.4% of workers were victims of violence at work and this has been largely stable over time (HSE Annual Statistics, 2020). This is in stark contrast to the much higher figures for NHS staff.

The International Labour Organisation (ILO) set out the Violence and Harassment Convention where it recognised workers' right to work in an environment free of violence and harassment. The UK confirmed the ratification of the Convention in 2022. The Convention establishes that "the term "violence and harassment" in the world of work refers to a range of unacceptable behaviours and practices, or threats thereof, whether a single occurrence or repeated, that aim at, result in, or are likely to result in physical, psychological, sexual or economic harm, and includes gender-based violence and harassment" (ILO C190 Convention, 2019). The HSE defines work-related violence as "any incident in which a person is abused, threatened or assaulted in circumstances relating to their work. This can include verbal abuse or threats as well as physical attacks."

In 2018 the NHS Violence Reduction Strategy was published (Department of Health and Social Care, 2018) and 2021 saw the launch

* City, University of London, Northampton Square, EC1V 0HB, London, UK.

E-mail address: v.serra-sastre@city.ac.uk.

¹ The NHS Staff Survey was released and used under a data sharing agreement with NHS England.

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of the Violence Prevention and Reduction Standard (NHS England, 2021), both aimed at preventing and reducing violence from patients. These initiatives place the responsibility on organisations to design strategies that assess risks, develop action plans for prevention and take appropriate action to tackle work-related violence. Trust in the management team in each individual organisation and their practices is likely to determine the success of these strategies (Pariona-Cabrera et al., 2020). The literature suggests managers play a leading role in promoting a safe-working environment that boosts productivity and minimises employee's turnover (Lazear et al., 2015; Gosnell et al., 2020; Friebel et al., 2022; Alan et al., 2023). At the individual staff level, violence decreases job satisfaction and has an impact on physical and emotional well-being, that could even compromise the safety and quality of care to patients (Shields and Price, 2002, Lanctôt and Guay, 2014; Mento et al., 2020). Workplace violence is widespread in health care systems worldwide. This has led to a growth in international research to understand the risk factors of exposure, implications for victims, the effectiveness of interventions and to the development of country-specific policies to tackle this workforce challenge (Wiskow, 2003, Lanctôt and Guay, 2014; Guay et al., 2014; Geoffrion et al., 2020; Somani et al., 2021; Lim et al., 2022).

Societal costs of victimisation for violent crime are substantial, typically differentiating between direct costs such loss of earnings and productivity and indirect costs related to intangible aspects such as mental distress that victims experience. The cost of victimisation not only varies depending on the type of crime but also by victim's gender (Dolan et al., 2005; Johnston et al., 2018). Johnston et al. (2018) estimate these are on average A\$88,000, A\$102,000 for females and A\$79,000 for males. There are significant long-term labour out-comes effects after victimisation, again with heterogeneous effects by gender (female victims have lower earnings than males) and type of crime (with physical violence having the largest effect, leading to higher health care expenditure and increased chance of claiming disability benefits) (Bindler and Ketel, 2022). Although these estimates are not based on work-related violence, estimates for the costs of violent crime in the working environment found in the literature (Folke and Rickne, 2022) suggest that the expected costs of violence in the NHS workplace would be similarly large.

This paper is related to two distinct strands in the literature. The first one relates to the impact of violence perpetrated in the workplace and its implications for labour outcomes. The literature that looks into work-related violence focus on violence between colleagues and gender differences in labour outcomes of victims and perpetrators. Adams-Prassl et al. (2023) use linked administrative data to estimate employment after violence, with a larger negative impact on female victims of male perpetrators, compared to the case where both victim and perpetrator are male. They also find that the firm experiences a change in gender composition with a decline in the share of female employees. Adams-Prassl et al. (2023) also suggest that manager's gender matters in response to the violent event, with female managers firing perpetrators and worsening their employment prospects. Folke and Rickne (2022) study sexual harassment in the workplace using matched survey and administrative data. Female workers are three times more likely to report sexual harassment than male workers, and it is more prevalent in firms where the employee is part of the gender minority. This has implications for gender segregation and widening the gender wage gap. They also run an experiment and estimate a cost of victimisation of approximately 10% of the employee's wage. Reporting of sexual harassment is also closely related to outside options, with higher underreporting when employment rates or unemployment benefits are lower (Dahl and Knepper, 2021).

Secondly, the paper contributes to the strand of literature focused on understanding the determinants of quitting the health care workforce. A growing literature has paid particular attention to the determinants of workforce retention in the health care sector, mostly motivated by the persistent staff shortages in health care services in the past few years.

Among some of the determinants that have a positive impact on job satisfaction are having opportunities for development and promotion, working nights, workload and family composition (Shields and Ward, 2001; Eberth et al., 2016; Holm^os, 2002; Andreassen et al., 2017). The impact of pay on retention has generally indicated that wages do not play a determinant role, with inelastic labour supply for doctors and nurses (Frijters et al., 2007; Andreassen et al., 2013; Crawford et al., 2015). However, the impact of violence at work on retention has not received much attention. Evidence indicates that job satisfaction lowers when nurses experience racial harassment (Shields and Price, 2002). During the recent Covid-19 pandemic, the long-term care workforce experienced high levels of abuse, decreasing staff wellbeing and leading to an increase in the likelihood of leaving not only their current job but also to leave the sector entirely (Saloniki et al., 2022).

In this paper we examine the impact of work-related violence on intention to leave the organisation by healthcare workforce in NHS acute hospitals. We use the NHS Staff Survey from 2018 to 2022, one of the largest workforce surveys available. The choice of study period is determined by the consistency and availability of the main variables of interest on intention to quit and violence, which were both simultaneously recorded from 2018 onwards. The information on violence collected in the NHS Staff Survey allows to differentiate between physical and verbal assault, hence we examine separately these two types of abuse on quitting behaviour. Research has mostly focused on violence from patients (Spelten et al., 2020; Stafford et al., 2022) but we are also able to clearly differentiate abuse from patients, managers and colleagues. Most importantly, we examine quitting intentions across all staff groups in the NHS, including clinical and non-clinical professionals. This is in contrast to most of the literature that focused on particular staff groups, such as nurses and doctors (Geoffrion et al., 2020). The second half of our study period overlaps with the onset of the Covid-19 pandemic. Hence, we further examine whether the pandemic magnified the effect of violence on intention to quit. To the best of our knowledge, this is one of the first papers to provide a comprehensive analysis of intention to quit and workplace violence in NHS acute hospitals, quantifying differences in effects by violence type, perpetrator and staff groups, and also to study the role of the pandemic.

Exposure to violence has a devastating impact on victims, including deterioration in physical health, increased anxiety, stress and depression, lowered quality of patient care and a reduction in quality of life (Lanctôt and Guay, 2014; Mento et al., 2020). Given the extent of abuse against healthcare workers, organisations use a wide range of interventions to prevent and reduce the number of violent cases (Geoffrion et al., 2020; Spelten et al., 2020). For employees eventually exposed to violence, the support received may help to partially reduce the cost of victimisation. Trust in managers to implement adequate processes to support victims will play a key role in mitigating the effects of abuse (Pariona-Cabrera et al., 2020; Zhang et al., 2021). In the last part of the study, and based on the literature on the consequences of violence for staff, we explore some potential mechanisms to understand possible drivers of intention to quit. We mainly look at physical and mental health, patient care and trust in managers, as these are variables available in the Staff Survey.

2. Data

We use the NHS Staff Survey, one of the most extensive staff surveys collected every year to understand the working experience of NHS staff in England. The survey is administered during a two-months period running from September to November each year and it is compulsory for all NHS trusts. Staff eligible to take part in the survey are those on full- and part-time contracts employed by the trust on 1 September of the year, staff on fixed-term contracts, training nurses, staff on secondment (in a different trust or hosted by the trust on their payroll), sickness leave and parental leave. The survey includes questions that relate to the job involved, about the management team, health and well-being at work,

training and development, the organisation and individual respondent characteristics such as gender, age, religion, ethnicity and staff occupational group they belong to. In this paper we use the NHS Staff Survey information collected in acute hospital trusts only. Answers to the questionnaire are anonymous and therefore it is not possible to link respondents from one year to the next. This is therefore a repeated cross-sectional study. We employ data from years 2018–2022, which amounts to a very rich and large sample size of about 1,814,120 observations across the five years. No ethical approval was needed as we use secondary data.

2.1. Intention to quit

Since 2018, the NHS Staff Survey includes a battery of questions that reflects respondents job satisfaction and their intention to quit the organisation. The survey technical reports specifically gather these questions grouped under the *Morale* theme and explicitly state that these reflect the respondents *Intention to leave* (NHS Staff Survey Coordination Centre, 2022). In particular, the questions presented in the questionnaire are the following:

1. I often think about leaving this organisation.
2. I will probably look for a job at a new organisation in the next 12 months.
3. As soon as I can find another job, I will leave this organisation.

Respondents could mark one of the following options: strongly disagree, disagree, neither agree nor disagree, agree and strongly agree. Based on these answers, we generate three indicator variables *Leaving*, *Job Search* and *Job Move*, which equal 1 when respondents stated strongly agree or agree to questions 1, 2 and 3 above, respectively, and 0 for all other categories. For the purpose of this paper, we mainly focus on the first question on intention to leave the organisation *Leaving*, and will run additional robustness checks using the other two questions. The definition of the variable *Leaving* may be sensitive to the categories included. Individuals that are risk averse may choose a neutral response to the question on intention to leave. To test the sensitivity of the results to the definition of the variable we re-categorise the *Leaving* variable to include those that strongly agree or agree and also those that indicate they neither agree nor disagree, and generate the variable *Leaving-Augmented*.

Arguably the three questions above on quitting behaviour reflect different intensities in respondents' intention to leave, with the question "As soon as I can find another job, I will leave this organisation" potentially capturing a stronger intention than the question on "I often think about leaving this organisation". To account for these differences, we also combine all three questions to generate a composite measure following the scoring system used by the NHS Staff Survey Coordination Centre that summarises all information in these questions and define the variable *Combined Score*, which is a measure reflecting the overall "Intention to leave" (NHS Staff Survey Coordination Centre, 2022). This measure is calculated as follows: for each question a score of 10 is allocated if the answer given is strongly disagree, 7.5 if disagree, 5 if neither agree nor disagree, 2.5 if agree and 0 if strongly agree. The composite measure is the mean across these three questions, conditional on at least two questions being answered by each individual.

Table A1 in the Appendix shows some descriptive statistics for the intention to leave variables defined above. On average 30% of respondents declare that they are considering leaving the organisation, 21% say that they will start looking for a job within a year (variable *Job Search*) and 16% that they will move job as soon as they find another job (variable *Job Move*).

2.2. Violence

The staff survey includes questions that directly ask respondents

about experiencing violence at work. In particular, the questionnaire includes separate questions for physical and verbal violence, allowing to examine heterogeneity in the impact of violence by type. The following question captures staff experiences of physical violence: "In the last 12 months how many times have you personally experienced physical violence at work from ... ? a) patients/service users, their relatives or other members of the public; b) managers; c) other colleagues". Respondents can choose from the following options: never, 1–2 times, 3–5 times, 6–10 times and more than 10 times. The questionnaire also includes the following question on verbal assault, specifically on harassment, bullying and abuse (HBA, this term and verbal violence are used interchangeably hereafter): "In the last 12 months how many times have you personally experienced harassment, bullying or abuse at work from ... ?" a) patients/service users, their relatives or other members of the public; b) managers; c) other colleagues" with the same scoring options as in the violence question.

Based on these questions, we create the following indicator variables: (1) Violence, a dummy equal to 1 if experienced any type of physical violence (from single or multiple perpetrators) and 0 if never; (2) Violence from patients (this variable will also include violence from service users, relatives and members of the public but for paucity the term violence from patients will be used), dummy equal to 1 if experienced violence from patients only; (3) violence from managers, a dummy equal to 1 if experienced violence from managers only; (4) violence from colleagues, a dummy equal to 1 if experienced violence from colleagues only; and (5) a dummy equal to 1 if experienced violence from multiple perpetrators (the combination of two or three perpetrators - patients, managers or colleagues). We follow the same steps to create five indicator variables derived from the HBA question. Definitions (2) to (5) compare those exposed to violence from single or multiple perpetrators to respondents who answer they have not experienced any abuse, therefore offering clean comparisons between victims and non-victims.

Fig. 1 shows the evolution over time of the physical violence and HBA variables according to violence definition. We include years prior to 2018, as these variables were available in earlier surveys, to give a temporal overview and illustrate the persistence of violence over time. Fig. 1 shows that HBA is more common than physical violence and that violence levels have remained relatively stable over the last few years. Table A2 in the Appendix presents the descriptive statistics for all violence variables included. The sample average shows that 15% of respondents state they were exposed to physical violence and 41% experienced verbal abuse. Table 1 shows some descriptive statistics for the full sample and also differences in violence exposure by gender. Respondents who prefer to self-describe have the highest percentage of physical violence, whereas those that prefer not to say have the largest exposure to verbal violence. Overall, females experience more violence than their male counterparts. Later in the analysis we will be examining differences in response across gender groups. Figure A1 in the Appendix reflects the prevalence of violence by occupational groups, displaying significant differences across staff groups. Health care assistants, ambulance staff and nurses and midwives have the highest exposure to violence.

2.3. Control variables

We also add additional control variables, including the respondents gender (male, female, prefer to self-describe and prefer not to say), age (in brackets of 10 years starting from 16 to 20, with the last bracket covering those aged 66+), ethnicity (white, mixed, Asian/Asian British, Black/Black British, Chinese and other background), occupational group (all occupational groups defined in the survey: allied health professionals/healthcare scientists/scientific and technical, medical and dental, ambulance, public health, commissioning, registered nurses and midwives, nursing or healthcare assistants, social care, admin/central functions/maintenance, general management) and an indicator for

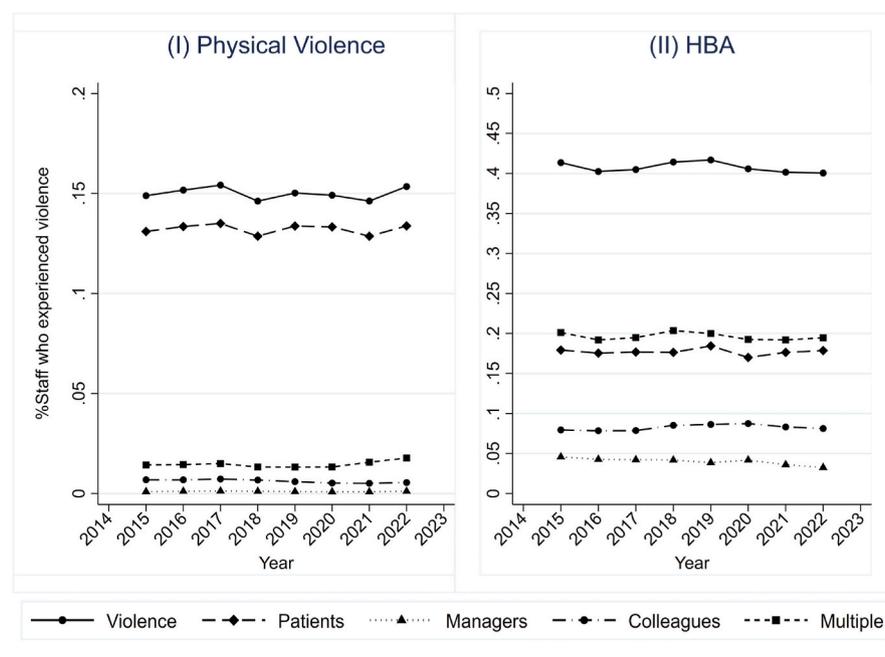


Fig. 1. Work-related violence.

Table 1
Violence by gender.

	Full Sample		Male		Female		Prefer to self-describe		Prefer not to say	
	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev
<i>Physical Violence</i>										
Violence	0.149	0.356	0.136	0.343	0.151	0.358	0.216	0.411	0.161	0.368
Patients	0.132	0.339	0.115	0.319	0.136	0.343	0.167	0.373	0.131	0.337
Managers	0.001	0.030	0.001	0.038	0.001	0.027	0.003	0.051	0.002	0.046
Colleagues	0.005	0.073	0.007	0.083	0.005	0.069	0.013	0.114	0.009	0.094
Multiple	0.014	0.117	0.016	0.127	0.013	0.112	0.049	0.216	0.026	0.159
<i>Verbal Violence</i>										
HBA	0.407	0.491	0.367	0.482	0.413	0.492	0.500	0.500	0.526	0.499
Patients	0.179	0.383	0.141	0.348	0.189	0.391	0.195	0.397	0.159	0.365
Managers	0.037	0.189	0.044	0.206	0.034	0.182	0.045	0.207	0.073	0.261
Colleagues	0.084	0.277	0.076	0.265	0.085	0.279	0.113	0.317	0.123	0.329
Multiple	0.194	0.396	0.175	0.380	0.195	0.397	0.298	0.457	0.337	0.473
N	1814120		362878		1407974		5877		37391	

Note: This table shows the descriptive statistics by gender and for the full sample for all years 2018–2022.

whether they have face-to-face contact with patients. The list of variables and some descriptive statistics are in Table A3 in the Appendix. There is no evidence of compositional changes across years.

3. Methods

We employ a two-way fixed effect (TWFE) model to estimate the impact of physical violence and HBA on intention to quit. Our treatment group is those respondents experiencing physical violence or HBA, and the control those that were not exposed to violence. In order to estimate the treatment effect we define the following specification:

$$y_{iht} = \beta_0 + \beta_1 \text{violence}_{iht} + \beta_2 X_{it} + \gamma_h + \gamma_t + \epsilon_{it} \tag{1}$$

where y_{iht} is a dummy equal 1 if respondent i employed in hospital trust h at time t states she often thinks about leaving the organisation, violence_{iht} is one of the indicator variables capturing whether the respondent experienced physical violence or HBA. X_{it} includes the control variables presented in Section 2.3. γ_h is a hospital trust fixed effect that reflects any time-invariant characteristics of the organisation where the respondent works, including (but not limited to) managerial culture and attitudes

towards staff well-being at work. γ_t is the year fixed effect that captures exposure to exogenous shocks common across organisations but that could differ over time.

The estimates obtained from the TWFE model could be biased if there remain unobserved characteristics that affect exposure to violence and intention to quit. To check the robustness of the basecase results we use the test of coefficient stability proposed by Oster (2019). The test compares models with and without control variables, examining the stability of the main estimate and movements in the observed R-squared. The test defines a bounding set.

$[\tilde{\beta}_1 - \beta_1^*]$, and suggests that the true value of the violence coefficient rests within the set. β_1^* is the bias-adjusted coefficient for the violence variables expressed as:

$$\beta_1^* \approx \tilde{\beta}_1 - \delta \left[\beta_1 - \tilde{\beta}_1 \right] \frac{R_{max} - \tilde{R}}{\tilde{R} - R} \tag{2}$$

where $\tilde{\beta}_1$ is the estimated coefficient and \tilde{R} is the R-squared of the regression with controls.

β_1 and R^2 are obtained from the uncontrolled regression. Oster (2019) proposes a value $R_{max} = \min[1.3R^2, 1]$ and an upper bound for δ , the coefficient of proportionality capturing the relative contribution of unobservables compared to observables, equal to $\delta = 1$.

To further add validity to the results from the TWFE model we also use a propensity score matching approach. We compute the propensity score based on pre-treatment variables using the nearest neighbour matching method with no replacement, where treated unit i is matched to the control unit j with the closest propensity score. Identification of the effect of violence rests on the conditional independence assumption stating that, given the set of observables, the intention to quit for the control group would be the same as the intention to quit for the treated group had they not been assaulted. We use the propensity score to restrict observations to the matched sample and test the robustness of the treatment effect estimated in Equation (1).

The main interest is on the effect of physical violence and HBA on intention to quit the organisation. However, the second part of the study period includes the years after the onset of the COVID-19 pandemic, as our sample data covers years 2020 through to 2022. Controlling for year fixed effect (as in Equation (1)) should account for temporal shocks that affect all organisations, including the onset of the pandemic. However, to study whether the pandemic had any additional impact on intention to quit for those experiencing physical violence or HBA over and above that of being subject to these behaviours we also estimate a difference-in-differences (DID) model using the canonical framework with a pre- and post-treatment period based on the interaction between being victim of physical violence or HBA and a dummy that indicates the period post-pandemic for years 2020–2022.

$$y_{iht} = \alpha_0 + \alpha_1 \text{violence}_{iht} + \alpha_2 \text{Post}_{t \geq 2020} + \alpha_3 (\text{violence}_{iht} \times \text{Post}_{t \geq 2020}) + \epsilon_{iht} \quad (3)$$

where violence_{iht} captures exposure to violence by individual i employed in hospital trust h in wave t and $\text{Post}_{t \geq 2020}$ is an indicator variable for the period after the onset of Covid-19 in March 2020 and covers years 2020, 2021 and 2022. The 2020 NHS Staff Survey was collected during the period September to November 2020, well after the onset of the pandemic. Our coefficient of interest is α_3 , indicating the average treatment effect on those exposed to violence after the onset of Covid-19.

Identification of the coefficient of interest relies on the parallel trends assumption that states that average outcomes for the treated and

control groups would have evolved in parallel in the absence of treatment. In other words, that the evolution of outcomes (intention to quit) in the pre-treatment period are comparable. Visual inspection (see Figures A2 and A3) of the intention to quit confirms similar dynamics were in place between treatment and control groups. The second assumption required for identification is that of no-anticipation. This is a plausible assumption given the unexpected nature of the Covid-19 pandemic. No-anticipation is also expected for violence given that attacks are typically exogenous and unforeseen. This is likely to hold if violence is exerted from patients, given they use the service temporarily. Violence from managers and colleagues could be anticipated if perpetrators remain in post after their violent behaviour and public information exists regarding their violent attitude. Arguably, information on violent assault would remain private information or perpetrators would exit the organisation.

4. Results

4.1. Basecase results

Based on Equation (1) we estimate the impact of physical violence and HBA on the intention to quit, using the survey question that aims to capture whether the respondent often considers leaving the organisation (Leaving). Fig. 2 shows the results. Both graphs present the results of the empirical specification on the effect of physical or verbal violence for each of the five different definitions of violence. Graph (I) displays the effect of physical violence. Staff experiencing any type of violence, as indicated by the top coefficient displayed in the graph, are 10pp more likely to state they often think about leaving the organisation. Violence perpetrated by patients or colleagues has a similar effect, increasing the intention to quit by 9 and 10pp, respectively. The impact is significantly larger if the perpetrator is a manager, which increases the intention to quit by 25pp. The intention to quit almost doubles if the employee experiences violence from multiple perpetrators, compared to the case where the employee experiences any type of violence. Graph (II) in Fig. 2 shows the estimated coefficients for HBA. These effects are quantitatively larger than in the case of violence, with the exception of HBA from patients. Any type of HBA increases the intention to quit by 21pp. The effect of HBA from patients and colleagues shows an increase in intention to quit by 5 and 11pp, respectively. The effect is again very large when the perpetrator of HBA is a manager, increasing the likelihood of quitting by 31pp. The effect is very similar if individuals

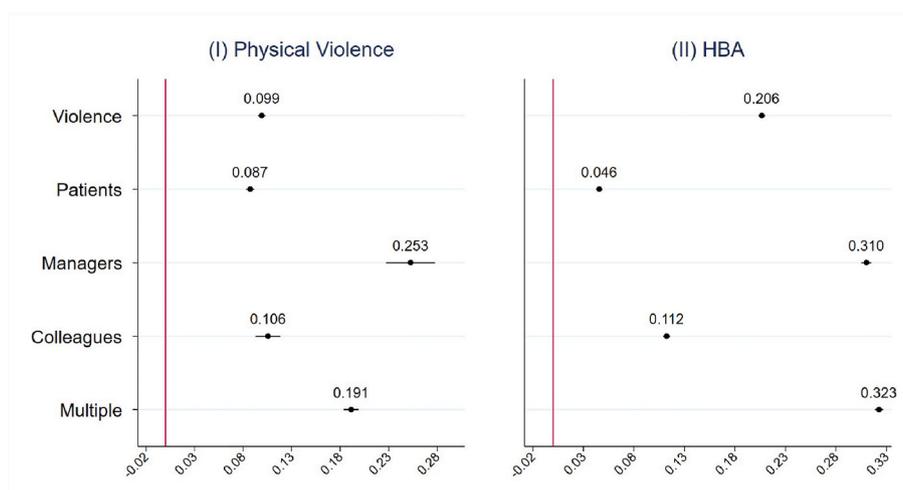


Fig. 2. The effect of violence on intention to leave

Notes: 95% confidence intervals shown. Standard errors clustered at hospital trust level. Each regression includes the following controls: gender, age band, occupational group, ethnicity, an indicator for whether the respondent has contact with patients, trust and year fixed effects. Sample size for each regression available in Table A4 in the Appendix.

experience violence from multiple perpetrators. Table A4 in the Appendix shows the estimates for the main violence variables and all controls included. We also re-estimate the basecase results using hospital trust and occupational group weights following the methodology used by NHS Staff Survey Coordination Centre NHS Staff Survey Coordination Centre (2022). Results are very close to those in Fig. 2. These are not presented here but available upon request.

We test the sensitivity of the results using alternative definitions of intention to leave. First, we estimate the effect of exposure to violence using the broader definition of intention to leave *Leaving - Augmented*. The results using this extended definition (shown in Figure A4 in the Appendix) are very similar to those in Fig. 2. Secondly, we check the stability of the results using the intention to leave variables *Job Search* and *Job Move*. The results (available in Figure A5 in the Appendix) follow the same pattern as in Fig. 2. Finally, we re-estimate the model using the variable *Combined Score*, which is the composite measure of intention to leave that calibrates the intensity of each question in intention to leave. As the scores assigned to each category decrease with the degree of agreement with the statement, a negative sign of the composite measure indicates higher intention to leave. Results are presented in Figure A6 and show a pattern that mirrors that of the basecase.

We next examine the potential impact of unobserved heterogeneity in biasing the estimated coefficients in Fig. 2 using the test of coefficient stability proposed by Oster (2019). Table A5 in the Appendix shows the bounding set when the parameter δ takes different values. The lower and upper bounds in the set are practically equivalent, suggesting unobserved heterogeneity has a negligible effect on the estimates and the bias-adjusted coefficients for violence are largely the same as those in the basecase. As final robustness check we use a matching estimator based on the nearest neighbour matching method, matching a treated individual to a control unit based on the estimated propensity score. Estimates are presented in Figure A7. The treatment effects obtained from the matched sample are virtually identical to the basecase for both definitions of violence. Overall, the results are consistent to the definition and estimator used. The estimates suggest that HBA has a larger impact than physical violence, with heterogeneous effects depending on the perpetrator of the abuse. Abuse from managers has the largest impact, followed by abuse from colleagues and patients. Experiencing several types of abuse also increases significantly the probability of engaging in active job search and intention of moving jobs.

4.2. Extensions

One of the largest effects arise when respondents indicate they have

been exposed to violence from several perpetrators. To gain a better understanding of the role of the perpetrator, we focus on those reporting exposure to violence from more than one type (based on the definition of the violence variable *Multiple*), and explore all possible combinations of perpetrators (patient/manager, patient/colleague, manager/colleague, patient/manager/colleague). Results in Fig. 3 suggest that the effects are considerably larger in all cases where the manager is among the group of multiple perpetrators.

All estimates presented above are based on measures that account for exposure to violence regardless of the frequency of the attacks. The questions in the NHS Staff Survey allow to differentiate how often the respondent has experienced physical or verbal abuse, and individuals are asked to indicate whether they experienced abuse 1–2 times, 3 to 5, 6 to 10 or more than 10 times. Focusing on the variables that indicate whether individuals have been exposed to violence from patients, managers and colleagues only we estimate the distribution of effects by frequency of attacks. We exclude from these results the general definition of violence and the definition of violence that accounts for violence from several perpetrators. These definitions include a large number of combinations of frequency and perpetrator type and we present here only clean comparisons by perpetrator type and frequency. Fig. 4 displays the estimates for both physical and verbal abuse. Overall, the results indicate that higher frequency of attacks increases intention to quit. Estimates for physical violence from managers have larger confidence intervals as the sample size is smaller but the coefficients remain statistically significant. A similar pattern emerges in that the impact of violence from managers has the largest effect. The only exception to this pattern is that the impact of physical violence from colleagues does not differ substantially according to frequency and even presents a slight reverse effect, in that higher frequency leads to lower intention to quit.

We have treated the questions for physical violence and HBA individually as per the responses provided to the survey questionnaire. However, there is some degree of overlap in some respondents simultaneously reporting physical and verbal abuse. In order to understand better the dynamics behind each type of violence we separate the sample into three groups each referring to those that solely experience physical abuse, those that are exposed only to HBA and those that report both physical and verbal abuse. We compare each group to those have experienced neither type of violence and re-estimate the basecase model. Figure A8 in the Appendix shows the results, each panel corresponding to the results for each sample. The estimates are consistent with the pattern observed in Fig. 2, with violence from managers and multiple sources having the largest effect, followed by colleagues and patients. After purging the effect of the simultaneous exposure to both

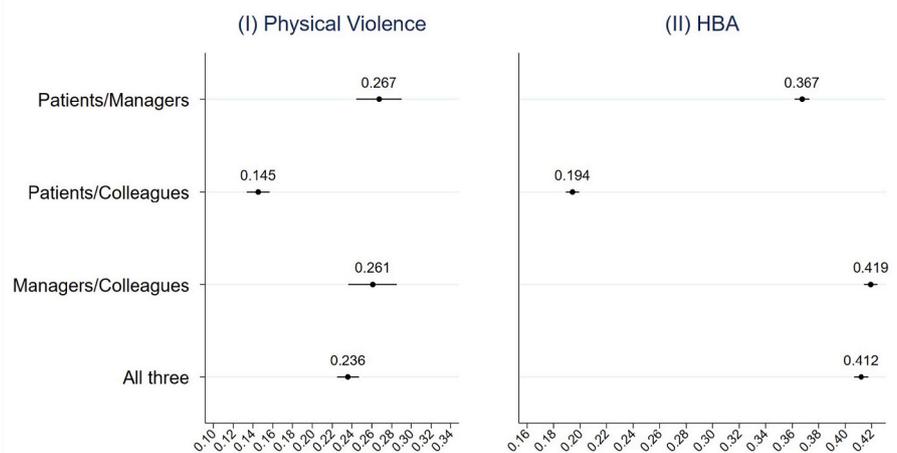


Fig. 3. All combinations of violent perpetrators

Notes: 95% confidence intervals shown. Standard errors clustered at hospital trust level. See Notes in Fig. 2 for a list of controls included.

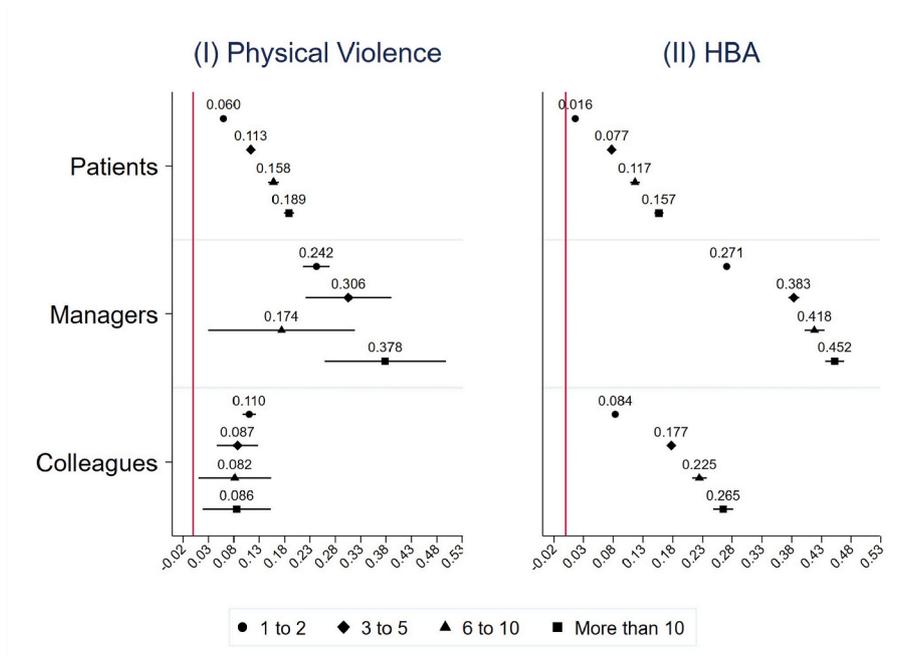


Fig. 4. Effects by frequency of attacks

Notes: 95% confidence intervals shown. Standard errors clustered at hospital trust level. See Notes in Fig. 2 for a list of controls included.

violence types, the results using the sample where respondents only report physical violence report a reduction in the magnitude of the effect. The effect for the sample that reports verbal abuse only and the sample that accounts for exposure to both physical and verbal violence show very similar results to the basecase. Overall, these results suggest the pull factor on quitting behaviour largely hinges upon the effect of verbal abuse.

4.3. Differences across staff groups

Next, we examine whether violence has heterogeneous effects by occupational group. We first use the broad definition of violence (including violence regardless of perpetrator type) for all eleven occupational groups defined in the NHS Staff Survey (as defined in the data section) and obtain the estimates for each subsample. Results are shown in Figure A9. There are no major differences by occupational group, with the point estimates being relatively close in magnitude. In order to

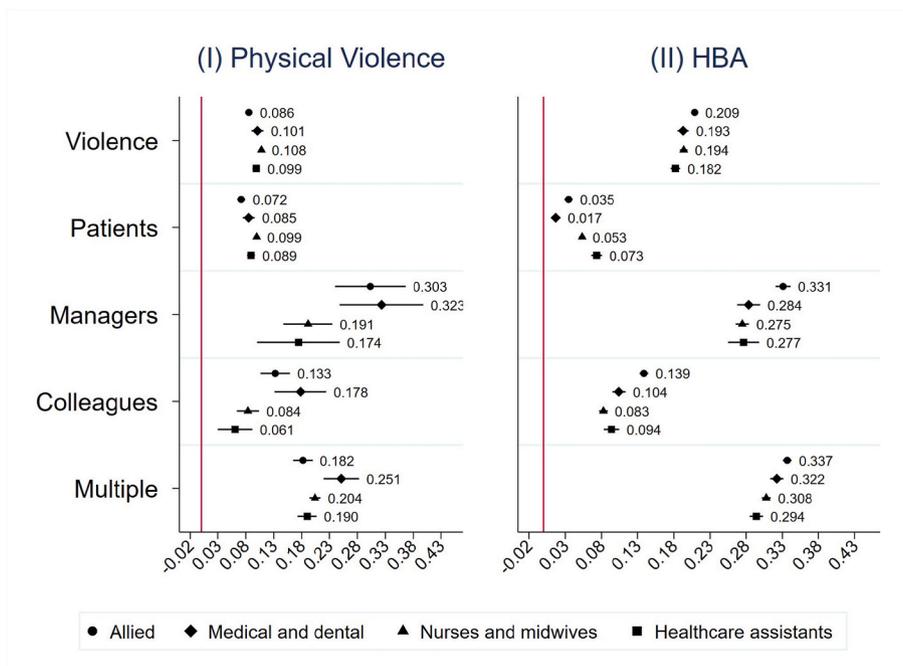


Fig. 5. Heterogeneity by Occupational Group

Notes: 95% confidence intervals shown. Standard errors clustered at hospital trust level. Each regression includes the following controls: gender, age band, ethnicity, an indicator for whether the respondent has contact with patients, trust and year fixed effects.

ascertain whether differences arise by staff group according to violence definition, we select four groups with largest percentage of violence exposure (allied professionals/healthcare scientists/scientific and technical, medical and dental, nurses and midwives, healthcare assistants). Fig. 5 shows the point estimates for all five indicator variables on violence. We are able to identify shared patterns of response when examining the effect of violence perpetrated by managers, colleagues or a combination of perpetrators, in which case medical and allied staff have a higher intention to leave. For the case of verbal violence perpetrated by patients in Graph (II), nurses and healthcare assistants are more responsive and indicate a higher intention to quit. Table A6 in the Appendix shows all coefficients obtained from the regression of the generic violence variable for physical and verbal attacks, and for all four staff groups listed. We only present results for the general definition of violence.

Additional analysis was carried out to identify differences by gender, age and ethnicity. Results are displayed in Figures A10, A11 and A12 in the Appendix. Intention to quit for respondents who prefer to self-describe is generally higher if they experience physical violence. In contrast, males are more responsive to exposure to verbal abuse in their intention to leave. Females and respondents who prefer not to state their gender state lower intention to quit when exposed to violence. Differences across age groups are clearly identified. Younger staff groups seem to have a larger intention to quit compared to older cohorts, and the effect is significantly smaller for those employees aged 66 and above, becoming statistically insignificant in some cases. Heterogeneous effects also prevail by ethnicity, with white and mixed individuals exposed to violence having a higher intention to leave the organisation. These differences are particularly marked when the violence is of physical nature and originated by managers or colleagues.

4.4. Did Covid-19 intensify the effects of violence on intention to quit?

In this section we examine whether the onset of the pandemic exacerbated the effect of exposure to violence. We use the canonical DID model on the matched sample. Fig. 6 reports the results. The estimates for physical violence in Graph (I) show that experiencing physical violence during the pandemic increases the intention to quit by 2.3pp, with an effect of similar magnitude if the perpetrator is a patient. Estimates in Graph (II) suggest that after the onset of the pandemic overall HBA increases intention to quit by 1pp, and 2pp if violence arises from patients. The estimates for HBA are smaller or similar to those obtained

for physical violence. These estimates are also significantly lower than the average treatment effects in Fig. 2, suggesting that the pandemic only added a modest marginal effect on intention to quit for staff who experienced violence. The effect of physical violence from managers, colleagues and from multiple perpetrators is not statistically significant. Similarly, the DID estimate for managers in the HBA graph is also statistically insignificant.

We further examine whether differential effects of the pandemic on individuals exposed to violence exist over the years after Covid-19. The DID specification now includes the interaction between the relevant violence variable and dummies for survey years 2020, 2021 and 2022. Results shown in Table A7 reveal heterogeneous effects over time. There are no statistically significant effects in 2020, with the exception of physical violence from managers which increases intention to leave by 10pp and verbal violence from patients which indicates a reduction in intention to leave of 1pp. Statistically significant effects for 2021 and 2022 are in line with the estimates in Fig. 6 and generally indicating the effects are quantitatively larger in 2022 compared to 2021.

4.5. Mechanisms

To shed light on the channels through which violence leads to increased intention to quit we examine some of the plausible factors driving this effect related to victims' health, patient care and trust in management. The survey includes the following questions: "In the last 12 months have you experienced musculoskeletal problems (MSK) as a result of work activities?" and "During the last 12 months have you felt unwell as a result of work related stress?". Information on staff health is limited in the survey and therefore we use these two questions as proxies for physical and mental health and generate the corresponding indicator variables equal 1 if respondents do not report any musculoskeletal problems or work-related stress, respectively.

We also examine if intention to quit arises as a result of poorer quality provision. For that purpose we construct an indicator variable based on the following question: "I am satisfied with the quality of care I give to patients/service users". The variable takes value 1 if respondent answers Strongly Agree or Agree, and 0 for all other categories. As an additional channel driving the intention to quit we explore the role of the management team in taking action in the aftermath of the violent assault. If the management team limits their intervention to simply apply processes rather than mitigating and handling cases appropriately, the working environment may lack the support and commitment

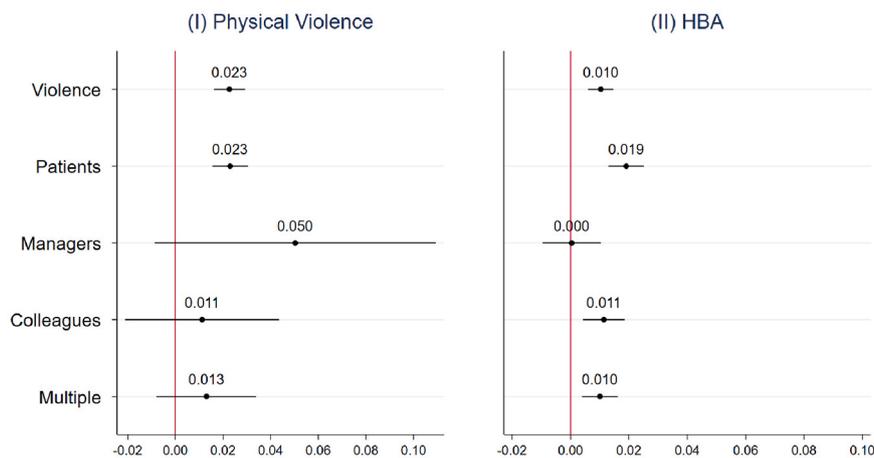


Fig. 6. DID estimates post-pandemic

Notes: Estimates presented are the interaction between the violence variable and the post-Covid19 dummy. Estimates obtained using the matched sample based on the nearest neighbour matching method. 95% confidence intervals shown. Standard errors clustered at trust level. Other controls included are: gender, age band, ethnicity, occupational group and an indicator for whether the respondent has contact with patients.

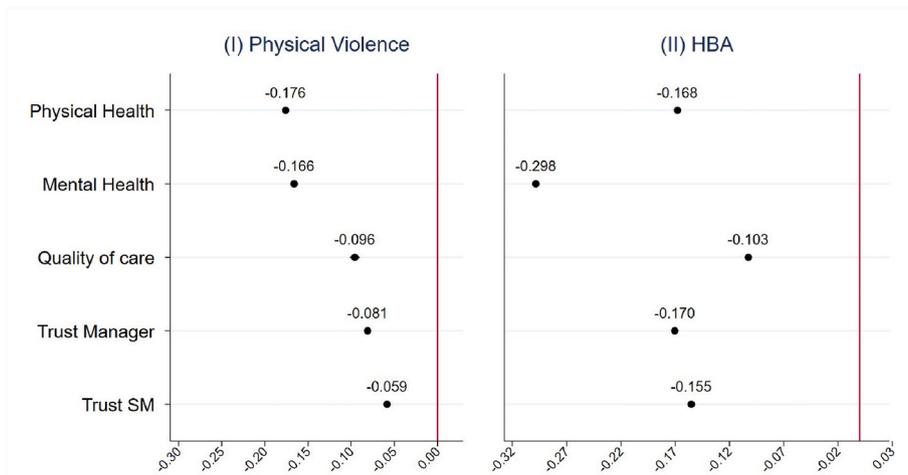


Fig. 7. Impact of violence on health, quality of care and management team

Notes: 95% confidence intervals shown. Each regression includes the following controls: gender, age band, occupational group, ethnicity, an indicator for whether the respondent has contact with patients, trust and year fixed effects. Standard errors clustered at trust level. Regressions for variables quality of care and trust in senior management use data from years 2018–2020, as these questions were removed from the 2021 and 2022 questionnaires.

to handle cases of violence. We use information that relates to the direct management and senior management. The former is based on the question “My immediate manager ... takes a positive interest in my health and well-being” and the latter on the question “Senior management acts on staff feedback”. Indicator variables on trust in managers take value 1 if respondent answers Strongly Agree or Agree, and 0 for all other categories.

Results are presented in Fig. 7. The empirical specification examines the impact of violence on the set of variables outlined above. The estimates correspond to the specification that includes the general violence variable, capturing exposure to violence regardless of the perpetrator type or frequency of assault. All factors studied act as mechanisms that help explain higher intention to quit after experiencing violence; however, their relative importance varies depending on whether the violence is physical or verbal. Graph (I) shows that the negative impact of violence on health is stronger than the deterioration in trust of managers or quality of care provided. Violence deteriorates physical and mental health by 18pp and 17pp, respectively, quality of care by 10pp, trust in direct management by 8pp and in senior managers by 6pp. Graph (II) shows that verbal abuse has a larger impact on mental health than physical health, with an estimated effect of 30pp compared to 17pp. The impact on quality of care is similar to Graph (I). However, verbal violence has a larger impact in trust of the management team, with an effect quantitatively larger compared to physical violence, 17pp for direct line management and 15pp for senior management. Both panels show that the increased mistrust is higher for the senior management compared to the most immediate management team.

5. Discussion

This study quantified the impact of physical and verbal violence on NHS staff intention to quit. We use one of the largest workforce surveys available, administered to all staff working in NHS trusts. The information related to violence is very rich, allowing to distinguish between physical and verbal abuse, type of perpetrator and frequency of attacks, among many other factors. This offers the opportunity for a detailed analysis at different levels, comparing violence types and experiences by all staff groups working in the NHS, rather than focusing on specific workforce groups such as physicians and nurses (Shields and Ward, 2001; Stafford et al., 2022; Pariona-Cabrera et al., 2020). Our results suggest a large and significant effect. Physical violence increases the probability of quitting by 10pp, but importantly this effect doubles when

staff are victims of verbal abuse. These results are in line with Saloniki et al. (2022) in the long-term care sector, although they don’t find a statistically significant effect on physical abuse. The results of the analysis also bring a new perspective of differential impacts by violence type, highlighting the higher prevalence of verbal abuse and the much larger impact this abuse has on intention to leave compared to physical abuse (Stafford et al., 2022).

Whereas the vast majority of the literature focuses mostly on work-related violence either arising from patients or peer interaction (Shields and Price, 2002; Adams-Prassl et al., 2023; Folke and Rickne, 2022), we can clearly differentiate abuse from patients, managers and colleagues. As opposed to Adams-Prassl et al. (2023) and Folke and Rickne (2022) we are not able to examine the long-term impact of victimisation in the workplace but instead focus on the intention to quit the organisation. This is equally informative to assess the damaging effect of violence at work for NHS staff, and the subsequent negative effects in human capital loss by NHS organisations if employees leave as a consequence of the abuse experienced.

The results suggest there are heterogeneous effects by perpetrator type, with the largest impact if the perpetrator is a manager. This pattern is consistent across specifications, and it highlights the detrimental effects that violent managers have on workforce and retention. The results align with Adams-Prassl et al. (2023), who also found a differential role of violent managers on employees’ labour outcomes. Although this paper and Adams-Prassl et al. (2023) examine different outcome measures, taken together the results reinforce the quantitatively larger damaging effect when the violent attack is exerted by a manager. The second largest effect arises when staff are exposed to violence from multiple perpetrators, followed by exposure to violence from colleagues, and to a lesser extent assault by patients. The latter result is not surprising given that many healthcare workers accept violent behaviour as an intrinsic characteristic of their jobs (Spelten et al., 2020; Lim et al., 2022).

The frequency of attacks matters. Recurrent violent events increase intention to leave to a much larger extent than single occurrences. In most cases, multiple instances of abuse lead to a threefold (or higher) increase in intention to quit. Other studies have similar findings, but they are only able to differentiate between frequent/infrequent violence and find smaller differences in the magnitude of the effects (Shields and Ward, 2001; Saloniki et al., 2022). Differences by occupational group exist, with estimates of physical violence on intention to quit being the largest for medical and allied healthcare professionals. Gender

differences arise, with larger effects for males and employees that prefer to self-describe. Differences also exist by age group, with younger cohorts stating an increased intention to quit compared to older groups. The effect is significantly lower for staff aged 66 and above, for whom outside opportunities may be reduced if they are close to retirement age. White individuals and respondents of mixed ethnicity are also more likely to leave the organisation if they are exposed to workplace violence.

Our analysis of the impact of Covid-19 on violence and intention to quit is one of the first to estimate differences before and after the onset of the pandemic. Estimates suggest that after the onset of Covid-19, violence adds between 1pp and 2pp on intention to quit. The effect is not statistically significant for physical violence when the perpetrator is a manager or colleague, or there are multiple perpetrators. In the case of verbal abuse, only violence from managers is statistically insignificant. A potential explanation for the lack of effect or for such quantitatively small effect of violence from peers (or multiple perpetrators) is that staff internalised violent actions from managers and colleagues, and contextualised these behaviours as explained by the pressures imposed to all workforce during the pandemic. Some of the potential mechanisms behind the intention to quit are poorer physical and mental health, the quality of patient care provided and an increase lack of trust in the management team. These findings are in line with the evidence of the detrimental effects of exposure to violence (Lanctôt and Guay, 2014; Pariona-Cabrera et al., 2020; Mento et al., 2020) and highlight these as aspects to monitor and support, to mitigate the effects of abuse.

There are some limitations to this study. The NHS Staff Survey is one of the largest workforce surveys among healthcare employees and it has a rich set of information on a wide range of descriptors of the working environment. However, the specific information on violence has several limitations. First, the survey does not provide any information on the severity of injuries involved in the physical attack and therefore we are not able to explore whether the impact varies according to this. Secondly, in the case of violence from managers or colleagues, we do not know who exactly the perpetrators are, whether this is from peers in the same team or in the broader working environment. Similarly, we are not able to understand whether the violent manager or colleague remains in post or leaves the organisation, limiting our capacity to examine long-term consequences between peers and wider network effects of having violent staff in an organisation. Thirdly, the sample includes staff who are on parental and, since 2021, sick leave for up to 12 months. Including these respondents could potentially introduce some bias in the results. These individuals are not at work for a period of time and their responses may not align with their most recent experience. We can't identify staff eligibility to take part in the survey, and this remains a limitation of the analysis. Finally, our data does not allow tracking individual respondents after the survey, and it is not possible to validate whether intention to quit leads to an actual exit from the organisation. However, the measure of intention to quit is in itself indicative of job satisfaction (Pelly, 2023) and signals that exposure to violence in the workplace lowers the well-being of NHS employees, challenging the status of organisations as safe working environments.

6. Conclusions

Workplace violence is widespread in the NHS. The NHS Staff Survey shows 15% of staff are victims of physical violence and 41% experience verbal violence. These figures have changed little over the years. The implications of assaulting the health care workforce are far-reaching, and include among others deterioration of health, trauma, compromised quality of healthcare services and decreased job satisfaction (Lanctôt and Guay, 2014; Lim et al., 2022). In this paper we examine the impact of violence on the intention to quit, differentiating between physical violence and verbal assault. Our findings consistently show that exposure to violence increases intention to leave, with a larger effect for verbal violence compared to physical abuse. Our study has relevant

policy implications as it identifies differences by perpetrators, severity and heterogeneity in responses by specific staff groups (occupational groups, gender, age and ethnicity).

Current policies mainly address strategies to reduce violence from patients. Although the most prevalent violence is from patients, we find that the largest impact arises from assaults from managers, followed by colleagues, and to a lesser extent assault by patients. There is a need for these policies to factor in the role that violence from peers, and especially from managers, has on workforce quitting behaviour and staff well-being. We have identified several factors that generate unequal responses to violence. Our results clearly signal how frequent exposure to violence create a toxic working environment likely to worsen staff retention. We also find unequal responses to violence across groups. Some staff groups, such as doctors, males, staff of white and mixed ethnicity, or younger workforce, have higher intention to quit. Groups with lower intention to quit such as older staff, females and those who prefer not to say, or ethnic minorities are more likely to stay in unsafe working environments, with the potential to further aggravate the future risk of victimisation. The identification of these characteristics has the potential to inform group-specific recommendations to mitigate the effects of violence on retention. Overall, it is important to understand the consequences of work-related violence on intention to quit, not only as a determinant of staff job satisfaction but also as a contributing factor to staff turnover in the current context of acute and persistent staff shortages in the NHS.

CRedit authorship contribution statement

Victoria Serra-Sastre: Conceptualization, Data curation, Formal analysis, Methodology, Writing - original draft, Writing - review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.socscimed.2023.116458>.

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