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EMPIRICAL RESEARCH QUANTITATIVE

Symptoms of post-traumatic stress disorder in early career nurses during the COVID-19 pandemic: A longitudinal survey study

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Abstract

Aim: To investigate the mental well-being of early career nurses working in the United Kingdom during the COVID-19 pandemic, with a particular emphasis on symptoms related to post-traumatic stress disorder.

Design: A longitudinal survey study.

Methods: Data were acquired at three timepoints during the COVID-19 pandemic (between May 2020 and March 2021) to determine whether symptoms of post-traumatic stress disorder persisted over time. Quantitative measures of well-being were supplemented with survey data on the nurses' experiences of working during the pandemic.

Results: Twenty-seven per cent of participants suffered from persistent symptoms of post-traumatic stress while working as nurses during the pandemic. The nurses' baseline resilience, as well as their perception of the quality of their work environment, were significant negative predictors of symptoms of post-traumatic stress. Participants identified a range of strategies that would have helped them during the crisis, including visible, consistent and empathetic leadership, adequate training and a supportive work environment.

Conclusion: The context of the pandemic has highlighted the vulnerability of the psychological well-being of early career nurses in the workforce. Immediate implementation of some of the more simple interventions suggested in this paper would provide early career nurses with rapid support. More complex support mechanisms should be given immediate consideration, with a view to implementation in the longer term.

Implications for the Profession: This study contributes new knowledge about the psychological well-being of early career nurses working during the pandemic and suggests support mechanisms that will be crucial for the retention of these nurses in the profession. A measurement of resilience may be useful for determining the appropriate level of support to provide to early career nurses.

This study has been reported in accordance with the relevant EQUATOR guidelines. Quantitative elements have been reported following STROBE guidelines.

Impact:

- Early career nurses are vulnerable to attrition from the profession. This could be exacerbated if the psychological well-being of these nurses is not being supported.
- Around 25% of early career nurses suffered from persistent symptoms of post-traumatic stress disorder while working as nurses during the height of the pandemic, which is a novel finding compared to other longitudinal studies.
- Understanding the psychological well-being of early career nurses working during a crisis period (such as a pandemic) equips nurse managers with appropriate strategies to improve nurses' emotional health and to enhance their retention within the workforce.
- The current findings may be of interest to clinical practitioners who have responsibility for the retention of nursing staff.

No patient or public contribution.

One of the authors is a statistician.

KEYWORDS
COVID-19, leadership, nurses, nursing staff, post-traumatic, PTSD, stress disorders, work environment

1 | INTRODUCTION

Retention of nurses is a global problem, with an estimated 9 million extra nurses and midwives needed worldwide by 2030 (World Health Organisation, 2022). One solution would be to increase the number of student nurses as a pipeline to supply the workforce. However, newly qualified nurses are particularly vulnerable, with 30%–60% leaving their first place of employment within 1 year (Halter et al., 2017). The transition from student to qualified nurse can be overwhelming, especially in a complex, fast-paced and pressured work environment (Halpin et al., 2017). Early career nurses, defined in this paper as nurses in their first 18 months of qualified practice, may encounter work-related stressors such as high workload or incivility (Halpin et al., 2017). Furthermore, they may not be able to draw upon the same resources, such as life experience, nursing experience or professional networks, as nurses who have been qualified for longer.

Literature addressing attrition from the nursing workforce highlights the influence of the work environment on decisions to stay in the profession. Difficult work environments increase the likelihood of stress, post-traumatic stress disorder (PTSD) and burnout (Wang et al., 2022). It is likely that the risk of such mental health conditions was elevated at the height of the COVID-19 pandemic, when nurses faced pressures from work patterns that were likely to have been unprecedented in their careers (van Elk et al., 2023). Work conditions during the COVID-19 pandemic underwent significant change. In addition to carrying out critical clinical tasks to support patients in acute settings, nurses were required to advocate for vulnerable groups who were disproportionately affected by the pandemic. Public discourse recognised the vital role of the nursing profession to the health system and drew attention to the exacerbation of the nursing shortage during the pandemic (Monteverde & Eicher, 2022). Nurses experienced situations that may have caused moral distress, such as the need to implement triage systems (either explicitly or covertly) due to limited capacity or resources. Other potential sources of moral distress included observing patients' suffering and death, enforcing visitor bans and navigating the implications of such bans for psychosocial care and the emotional well-being of patients and relatives. Nurses' anxiety about personal health vulnerabilities, as well as their fear of infecting relatives or colleagues, added to their psychological pressure (Cramer et al., 2022).

Since 2019, prolific research relating to the psychological effects of the COVID-19 pandemic on the healthcare workforce has been undertaken (Ghahramani et al., 2022; Saragih et al., 2021; van Elk et al., 2023). A systematic review identified that psychological issues were prevalent in healthcare workers during the pandemic, with physicians and nurses in particular likely to suffer from depression, anxiety, insomnia, PTSD and stress (Ghahramani et al., 2022). Pandemic-related work conditions, such as increased working hours, redeployment and caring for COVID-19 patients, were repeatedly associated with mental health disorders and intention to leave (Li et al., 2021). These studies raise concerns that crises such as the COVID-19 pandemic could cause loss to a profession with an already depleted workforce.

The effect of the pandemic on nurses' well-being has frequently been measured using clinical indications of PTSD. A common tool for this purpose is the PTSD checklist for DSM-5 (PCL-5), a 20-item self-report measure (Weathers et al., 2013). Although diagnosis of PTSD should be made by a clinician, preferably in conjunction with a structured clinical interview, tools such as the PCL-5 are useful for assessing symptom prevalence. Saragih et al. (2021) identified a prevalence of PTSD of up to 49% in healthcare workers at various

points of the pandemic. Another study found that nurses who had delivered direct care to COVID-19 patients suffered from intrusive thoughts and memories, moderate or high levels of anxiety, depression and PTSD (Hickling & Barnett, 2022).

There is scarce literature relating directly to the experiences of early career nurses. A notable exception is the study by Son et al. (2022), which concluded that organisational support was essential for early career nurses to remain committed to the role and to face the challenges presented by COVID-19. The study identified an increased risk of burnout and work-related stress in younger nurses, and highlighted the benefit of support from nurse managers, senior staff and colleagues. These findings are reiterated in a study of the Welsh nursing and midwifery workforce (Gray et al., 2022), which indicated that younger nurses experienced poor mental well-being in response to the pandemic. A series of surveys conducted by the American Nurses Association between 2020 and 2022 identified that younger nurses had more concerns about the effect of the pandemic on their well-being, and suffered more financial stress, than older nurses, leading them to consider leaving the profession. In the surveys conducted in 2022, participants continued to report workplace issues such as incivility, bullying and long shifts, which led to exhaustion, frustration and stress. Indeed, 30% of early career nurses continued to feel unprepared for the role (American Nurses Association COVID-19 Resource Centre, 2022). This constitutes preliminary evidence of the persistence of psychological effects past the peak of the pandemic. However, the study did not use a longitudinal design. Such a design would be valuable because the persistence of PTSD symptoms is an important factor in diagnosing and treating the condition: the Royal College of Psychiatrists (2020) suggests that PTSD symptoms may resolve on their own, but additional support should be sought after experiencing symptoms for 6 weeks.

There have been few studies that used a longitudinal design to explore persistence of PTSD. Sampaio et al. (2021) conducted a prospective cohort study to evaluate the mental health of nurses at three timepoints during the pandemic, although PTSD was not assessed. They concluded that psychological adaptation occurred over time, which mitigated the immediate impact on nurses' symptoms of anxiety, depression and stress. However, the participants were not identified as early career nurses and may have been able to draw on professional experience in the context of the pandemic. Cobo-Cuenca et al. (2022) focused on the mental health of senior nursing students as they transitioned into qualified practice over the course of the pandemic (between April 2020 and December 2020). High resilience scores were associated with lower levels of PTSD, anxiety and depression. In addition, although the participants continued to present with mental health problems at the second timepoint, the severity and prevalence of these symptoms had decreased.

2 | METHODS

The aim of this study was to investigate the psychological well-being of early career nurses working in NHS Trusts in London (United Kingdom) during the COVID-19 pandemic, with a particular emphasis on symptoms of post-traumatic stress disorder. The specific objectives were to understand:

- the extent to which early career nurses working during the COVID-19 pandemic showed symptoms of PTSD that were sustained over time;
- the relationship between early career nurses' resilience and the persistence of PTSD symptoms;
- the relationship between nurses' practice environments and the persistence of PTSD symptoms; and
- the key issues that resulted in distress and PTSD symptoms for early career nurses during the COVID-19 pandemic, and how the effect of these issues might be mitigated.

The study has been reported in accordance with the Strengthening the Reporting of Observational studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies (von Elm et al., 2008).

2.1 | Study design and setting

This study was developed as an extension to a 3-year research project, funded by the Burdett Trust for Nursing, which investigated the factors affecting the retention of early career nurses in the profession. The longitudinal data analysed in this paper correspond to the last timepoint of the original foundation study (T3) and the two timepoints of the extension study (T4 and T5). Figure 1 provides a timeline of the entire process, which is described in more detail in the following subsection.

2.1.1 | Research timeline

In the foundation study (unpublished), the participants started as final-year nursing students at a London university and ended the project as early career nurses working mainly in the Greater London area. Data on the participants' well-being and work environment were collected at four timepoints (T0–T3) between January 2019 and May 2020. At the final timepoint, the COVID-19 pandemic prompted the addition of a further metric, namely the PTSD Checklist for DSM-5 (PCL-5). PCL-5 guidance requires respondents to complete the checklist with reference to a specific stressful event, and it was noted that participants frequently mentioned the pandemic. Accordingly, it was decided that the psychological well-being of early career nurses during the pandemic would be investigated further, by extending data collection to two additional timepoints (T4 and T5) up to March 2021.

2.1.2 | Current study

The current study follows a longitudinal survey design, analysing the data acquired at timepoints T3–T5 (see Figure 1). Quantitative

analysis of self-report assessments was supplemented by analysis of responses to free-text questions. The main purpose of the quantitative analysis was to determine whether participants with high PCL-5 scores at T3 continued to show symptoms of PTSD after the peak of the first wave of the pandemic in the United Kingdom had passed. The qualitative data, which were analysed using a phenomenological approach, were intended to provide insight into the key issues underpinning PTSD symptoms experienced by early career nurses at different stages of the COVID-19 pandemic.

2.2 | Ethical approval

Approval to undertake the study was granted by the university ethics committee [ETH2021-0444] and the Health Research Authority [IRAS 245992].

2.3 | Participants

Participants in the foundation study (T0–T3) received an email invitation to participate in the extended data collection (T4 and T5). The participants in the original study had undertaken their nursing studies at a particular London university, either in the form of an undergraduate degree or a postgraduate diploma, in either adult or child nursing. The original study did not stipulate any exclusion criteria and the only inclusion criterion was based on the year of study: participants were recruited from the cohort that started their studies in September 2016 and qualified in 2019.

All prior participants ($n=99$) were approached to participate in the extended data collection (T4 and T5), even if they had not responded at all previous timepoints. At timepoint T3, the participants were in their first year of qualified practice and were working as registered nurses in patient-facing nursing roles in a variety of settings. Participants varied with respect to their prior work experience and the changes in their work patterns due to COVID-19. Nevertheless, it is highly likely that all participants were influenced by the pandemic to some extent due to its pervasive impact on healthcare service delivery in the United Kingdom, and especially in London. Thus, the study aimed to capture the generalised effects of the pandemic across the hospital system.

2.4 | Data collection

The timepoints analysed in this study corresponded to the latter part of the first wave of the COVID-19 pandemic (T3: May 2020), the build-up to the second wave (T4: December 2020) and the tail end of the second wave (T5: March 2021), as judged by UK hospitalisation rates. At each timepoint, the participants completed an online questionnaire via the platform Qualtrics (Qualtrics, Provo, UT). A link to the survey was emailed to the participants by one of the researchers (unknown to them prior to the study). To aid retention rates, participants received up to three reminders to complete the questionnaire and received an online shopping voucher (value 20 GBP) for their participation at each timepoint. The following validated questionnaires were administered at all three timepoints:

- PTSD Checklist for DSM-5 (PCL-5)
- Shirom–Melamed Burnout Measure (referred to herein as 'burnout')
- Depression, Anxiety and Stress Scale (DASS-21)
- Warwick–Edinburgh Mental Well-being Scale (referred to herein as 'well-being')
- Nursing Work Index-Revised (NWI-R)

A further metric employed in the quantitative analyses was resilience, which was assessed only once (at timepoint T0) using the Brief Resilience Scale. This parameter is referred to herein as 'baseline resilience', to distinguish it from the other variables, which were measured across time. The T0 questionnaire also collected information pertaining to a wide range of demographic and personal

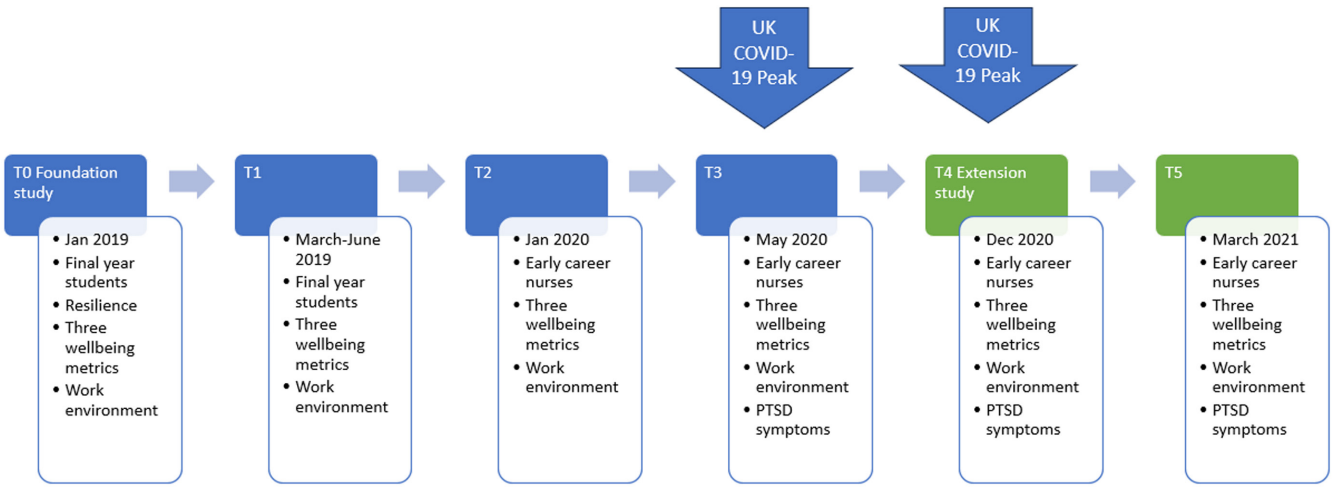

FIGURE 1 Timeline of the foundation study (T0–T3) and the extension study (T4–T5).

characteristics (e.g. gender, age and ethnicity), as these could, in principle, act as confounding factors with respect to the relationships of interest.

In the extension study (T4 and T5), in addition to the quantitative measures, free-text questions were posed to elicit qualitative responses. Participants at timepoint T5 were asked four additional questions to encourage them to reflect on their overall experience of working during the pandemic. All questions are presented in Table 1. Questions 1 and 2 are based on the standard procedure for administering PCL-5 as part of a psychological assessment (U.S. Department of Veteran Affairs, 2016). Questions 3 to 6 were designed to shed light on the relationship between the nurses' work environment and their symptoms of PTSD. Accordingly, it was expected that the responses would suggest potential strategies for mitigating mental health symptoms. The questions were compiled by the research team and were not piloted more widely.

2.5 | Data analysis methods

The first three objectives of the study (presented at the beginning of Section 2) were addressed via quantitative analysis, using two different regression models. As the focus of the study is symptoms of PTSD, the response variable used in both models was the PCL-5 score. First, a linear mixed-effects regression model was applied to the full set of observations ($n = 145$), with a random intercept per subject, to examine the factors influencing PCL-5 score. The explanatory variables were timepoint (a categorical variable), NWI-R score and baseline resilience. In addition, an indicator variable was used to represent the number of timepoints at which the participant completed the survey (1, 2 or 3). This made it possible to determine whether any of the relationships of interest were affected by the participant's propensity to respond, which is a potential source of bias. The possibility of incorporating demographic characteristics, such as the participant's age, was also considered. However, their inclusion did not improve model performance, as judged by adjusted R^2 and the Akaike Information Criterion (AIC). Similarly, a model that included the interaction between resilience and NWI-R score was explored, but the interaction was found to be nonsignificant and its inclusion reduced the model fit.

The goal of the second regression analysis was to examine the effect of the two main explanatory variables (baseline resilience and NWI-R score) on the *persistence* of PTSD symptoms. For this purpose, a linear mixed-effects model was implemented using the subset of participants ($n = 31$) who (i) responded at more than one timepoint and (ii) yielded at least one PCL-5 score ≥ 23 (the median of the full sample). The response variable was the mean PCL-5 score, averaged across all available timepoints for each subject. Thus, participants who yielded a high mean PCL-5 score (bearing in mind that at least one of their scores was at or above the median) were considered to have symptoms of PTSD that were relatively persistent across time. The explanatory variables were the mean (i.e. time-averaged) NWI-R score and the baseline resilience.

Table 2 provides further information on the quantitative tools used in the regression analyses. The final column cites a publication that reports data on the psychometric properties of the assessment (e.g. internal consistency, test–retest reliability and construct validity). Given that the tools used in this paper have been subject to multiple psychometric evaluations (in different population samples), Table 2 provides a reference to a recent publication that contains a comprehensive review of the previous literature.

The last objective of the study was explored using qualitative analysis. This was applied to the questions in Table 1. The method used was thematic analysis (Braun & Clarke, 2022). Inductive analysis of the content of the free-text survey questions was conducted primarily by one author (BD), an experienced female qualitative researcher, in collaboration with a second experienced female researcher and nurse (JB). Initial coding was discussed and refined until agreement was reached about the final themes.

3 | RESULTS

3.1 | Participants

Data from 68 participants were included in the analysis, of whom 29 responded at all three timepoints (T3, T4 and T5), 19 responded at two of these timepoints and the remaining 20 at a single timepoint.

TABLE 1 Qualitative survey questions.

Timepoints 4 and 5	
1.	In what way, if any, did the coronavirus outbreak affect the way you answered the previous sections?
2.	Could you give us some details about the stressful experience you were thinking about while completing the last questionnaire? (this question was referring to PCL-5)
Timepoint 5	
3.	What support would have been most helpful for you on your ward under those circumstances?
4.	What support would have been most helpful for you from your manager under those circumstances?
5.	In your opinion, what would help most in future work situations as a method of support?
6.	Is there anything else you would like to say about support during the COVID-19 pandemic?

TABLE 2 Characteristics of the quantitative assessments used in the regression analyses.

Metric	Range of scores	Brief description	Interpretation/cut-offs	Reliability and validity data
PCL-5 (Weathers et al., 2013)	0–80	Twenty items corresponding to the DSM-5 symptom criteria for PTSD (e.g. 'In the past month, how much were you bothered by repeated, disturbing dreams of the stressful experience?') Responses are on a 5-point Likert scale (0 = 'Not at all', 4 = 'Extremely') and are summed across all 20 items	A cutoff score of 31–33 indicates that PTSD is probable. A reduction of 5 points across repeat tests is the minimum threshold for considering that an individual has responded to treatment.	Forkus et al. (2023)
Brief Resilience Scale (Smith et al., 2008)	1–5	Six items (three positive, three negative) that assess resilience from the perspective of personal agency (e.g. 'I usually come through difficult times with little trouble'). Responses are on a 5-point Likert scale (1 = 'Strongly disagree', 5 = 'Strongly agree') and the negative items are reverse-coded. The final score is the mean across the six items	A higher mean score represents higher resilience. Very low: 1.00–1.82 Low: 1.83–2.66 Medium low: 2.67–3.16 Medium: 3.17–3.66 Medium high: 3.67–3.99 High: 4.00–4.66 Very high: 4.67–5.00	Smith et al. (2023)
NWI-R (Lake, 2002)[a]	29–116	29 positive statements related to different aspects of the work environment, including quality of care, management support, and nurse-physician relationships (e.g. 'Praise and recognition for a job well done'). Responses are scored on a 4-point Likert scale (1 = 'Strongly disagree', 4 = 'Strongly agree') and are summed across all items	A higher score represents greater satisfaction with the work environment. A mean score per item of 2.5 (equating to a total score of 72.5) would represent a neutral view of the work environment	Lucas et al. (2021)

[a]Different versions of the NWI-R exist, consisting of different numbers of items. The version used in this study retains 29 items of the 49-item NWI-R (Sochalski et al., 1999), as proposed by Lake (2002).

Given that the invitation to participate was extended by email, the reasons for non-participation were unknown. In total, 145 questionnaires were analysed, which were distributed as follows: 62 at T3, 42 at T4 and 41 at T5. This final sample of 145 datasets was obtained after excluding data from participants who stated that they were not working as a nurse as well as data that were incomplete with regard to the variables of interest. Accordingly, three questionnaires were discarded at T3, two at T4 and one at T5. Note that exclusion at a given timepoint did not preclude inclusion at other timepoints.

The participants were mainly female (92.6%) and at timepoint T3, ranged in age from 21 to 47 years with a mean (standard deviation) of 27.5 (6.5). Most of the participants (68%) had graduated from a BSc nursing programme, while the remainder had completed a postgraduate diploma course. Sixty-two per cent of the cohort had studied adult nursing, while the remainder had studied child nursing. The most frequently stated ethnic backgrounds were 'African' (32%), 'White British' (25%) and 'Bangladeshi' (16%). A broad range of other ethnic backgrounds were represented, including 'Pakistani', 'Caribbean' and different 'mixed' ethnic backgrounds. When asked about their religious affiliation, the four most common responses were 'Muslim' (31%), 'Catholic' (23.5%), 'Protestant' (19%) and 'None' (23.5%). The baseline resilience scores at T0 had a mean (standard deviation) of 3.31 (0.83), a median of 3.33 and a range of 1.33–4.67 (see Table 2 for the interpretation).

3.2 | Quantitative findings

3.2.1 | Comparison of well-being measures

As noted in Section 2.4, the questionnaires included four mental health assessments: the Shirom–Melamed Burnout Measure (SMBM), the Depression, Anxiety and Stress Scale (DASS-21), the Warwick–Edinburgh Mental Well-being Scale (WEMWBS) and the PCL-5 Checklist (for capturing symptoms of PTSD). As PCL-5 is the focus of the present study, the other scores were not used in the regression analyses. Nevertheless, the time course of each measure has been plotted (see Figure 2) to gain a deeper understanding of changes in the participants' emotional well-being over time.

Figure 2 plots the mean normalised score (i.e. *z*-score) for each metric at each timepoint, obtained by averaging over the subset of participants who responded at all timepoints ($n = 29$). Note that the sign of the well-being score has been reversed (and is thus referred to as 'negative well-being') because a higher score signifies superior mental health. The *z*-scores were calculated using the normative data shown in Table S1. Due to the absence of agreed-upon normative data for these metrics, the mean and standard deviation were derived from studies with sample characteristics as similar as possible to those of the present population. Therefore, when interpreting Figure 2, it is important to bear in mind that the normative data were based on a variety of population samples. The main purpose of

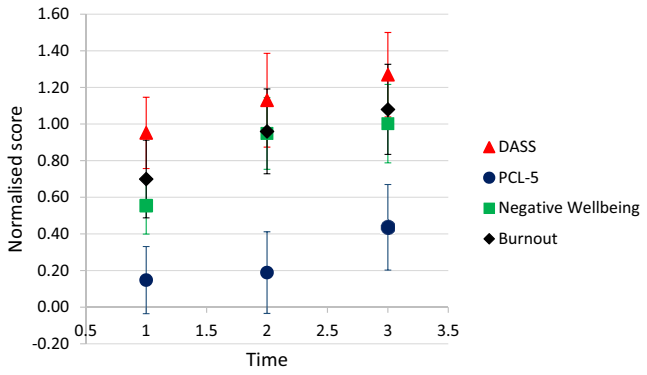

FIGURE 2 Time course of the mean normalised score, averaged over 29 participants, for each measure of emotional health. The raw data were transformed to z-scores using the normative data in Table S1. Error bars represent one standard error.

the graph is to examine how the scores change over time, while the scores themselves are of lesser interest. Nevertheless, it is worth commenting on two observations regarding the magnitudes of the normalised scores. First, it can be seen that the mean scores are notably higher than zero, implying that the early career nurses in this study had poorer mental health than the normative population samples. Second, the PCL-5 scores are closer to zero than the other mental health metrics. This is due to the fact that the 'normative' PCL-5 data were derived from people who reported a traumatic event (as defined by the DSM) because the checklist is designed for this type of population.

Paired *t*-tests were conducted to examine the significance of the differences between the temporal changes in normalised PCL-5 scores and the temporal changes in other metrics. No significant differences (defined as $p \leq 0.05$) for any of the comparisons were observed, although the difference between the change in negative well-being from T3 to T4 and the corresponding change in PCL-5 score approached significance ($t = 1.79$, $p = 0.08$). The similarity in temporal behaviour of all four metrics lends credence to the findings presented in the following subsection.

3.2.2 | Changes in PCL-5 score over time

The mean and median PCL-5 scores at each timepoint are shown in Table 3, revealing an overall increase in PTSD symptoms over time. The mixed-effects model to determine the predictors of PCL-5 (Table 4) demonstrated that while the variable 'timepoint' did not reach significance as a main effect ($F = 2.23$, $p = 0.11$), the regression coefficient for the change in PCL-5 score between T3 and T5 was significant at the 5% level ($p = 0.035$). There was no significant change in PCL-5 score between T3 and T4 ($p = 0.42$). The number of timepoints at which the participant responded had no significant effect on PCL-5 score, indicating that propensity to respond was not a significant source of bias. The remaining predictors (NWI-R and baseline resilience) are discussed in the following subsection.

In addition to calculating the overall trends for the group, the changes on an *individual* level were examined. For this purpose, a change in PCL-5 score of at least 5 points was considered to be 'reliable' in the sense that it is unlikely to be due to chance (U.S. Department of Veterans Affairs, 2016). Changes in score of less than 5 points were classified as 'no change'. The results are shown in Figure 3, where each chart is based on data from 38 participants (i.e. all participants who responded at the two timepoints in question, noting that this group is different for each chart). It can be observed that for both temporal comparisons, approximately two-thirds of participants yielded a PTSD score that was either stable or increased across time.

Finally, we determined the proportion of participants who exhibited a PCL-5 score greater than or equal to 31 at two or more timepoints. This is an important summary statistic because a score of 31 is considered to be the minimum required for a potential diagnosis of PTSD, and symptoms of PTSD that persist over time are of greater clinical concern in the sense that they are less likely to resolve without treatment. For the subgroup of participants who responded at two or more timepoints ($n = 48$), 13 people (27%) had a PCL5 score ≥ 31 on at least two occasions.

3.2.3 | Determinants of PCL-5 score

Two potential predictors of PCL-5 score were investigated: the participant's baseline resilience and their perception of the quality of their work environment (as assessed using the NWI-R, which was administered at every timepoint). As shown in Table 3 (see Section 3.2.2), resilience was found to be a significant, negative predictor of PCL-5 ($p = 0.002$), suggesting that early career nurses with lower resilience are at greater risk of developing symptoms of PTSD. Table 3 also reveals a strong negative influence of the perceived quality of the work environment ($p = 0.006$).

We conducted a further analysis to determine whether the same two factors are also predictive of *persistently high* PCL-5 scores. As explained in Section 2.5, this question was addressed using the subgroup of participants ($n = 31$) who responded at more than one timepoint and yielded at least one PCL-5 score at or above the median. The model did not include the effect of time; rather, the PCL-5 and NWI-R scores were averaged over all available timepoints for each participant. To begin with, two separate models were implemented, one using mean NWI-R score as the sole predictor and the other using only the baseline resilience. Each variable was found to be a significant predictor of mean PCL-5 score when tested in isolation (resilience: mean slope = −7.17, $p = 0.037$; NWI-R: mean slope = −0.52, $p = 0.017$). However, in the best-fit model, which included both predictors simultaneously, resilience failed to reach significance while mean NWI-R score was of borderline significance (see Table 5). There was a moderate degree of correlation between the two predictors (Pearson's $r = 0.302$, one-tailed $p = 0.052$). In other words, as might be expected, nurses with higher baseline resilience held a more positive view of their work environment.

TABLE 3 Descriptive statistics for PCL-5 at each timepoint.

Timepoint (no. participants)	Mean PCL-5 (SD)	Median PCL-5
T3 ($n=62$)	22.6 (17.9)	16.5
T4 ($n=42$)	25.3 (21.7)	18.5
T5 ($n=41$)	28.1 (22.3)	25.0

TABLE 4 Predictors of PCL-5 score for the full dataset ($n=145$); adjusted $R^2=0.71$.

Predictor	Unstandardised regression coefficient: mean [95% CI]	*p*-value
Intercept	75.3 [49.2 to 101.4]	<0.001
Two timepoints[a]	−2.9 [−14.9 to 9.2]	0.64
Three timepoints[a]	0.5 [−10.4 to 11.4]	0.93
T4[b]	2.2 [−3.1 to 7.4]	0.42
T5[b]	5.7 [0.4 to 10.9]	0.035
Baseline resilience	−7.83 [−12.8 to −2.9]	0.002
NWI-R	−0.3 [−0.5 to −0.1]	0.006

[a]These rows show the effect of the *number of timepoints* at which the participant responded (a categorical variable, with the reference category being a single timepoint).

[b]These rows show the effect of *timepoint* (a categorical variable, with the reference category being T3).

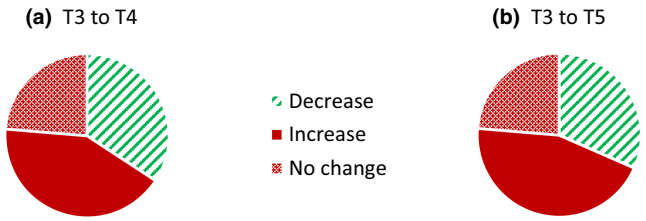

FIGURE 3 Proportion of participants who exhibited a reliable decrease, a reliable increase and no reliable change in PCL-5 score between (a) T3 and T4; (b) T3 and T5.

TABLE 5 Predictors of persistently high PCL-5 scores in participants who yielded at least one score at or above the median ($n=31$); adjusted $R^2=0.68$.

Predictor	Unstandardised regression coefficient: mean [95% CI]	*p*-value
Intercept	86.3 [49.8 to 122.8]	4.5e-5
Baseline resilience	−5.05 [−11.97 to 1.88]	0.15
Mean NWI-R	−0.43 [−0.86 to 0.01]	0.053

3.3 | Qualitative findings

The free-text questions were analysed with a view to identifying themes, which are presented in Table 6 along with illustrative quotes. As would be expected, many of the themes are interrelated. Accordingly, each quote may be illustrative of multiple themes. In the remainder of this subsection, the themes in Table 6 are explored in greater detail. Note that the themes identified at the two timepoints (T4 and T5) were broadly similar, albeit with different relative importance. In the case where notable differences between the two timepoints were observed, these differences are described. Finally, the reader is advised that the responses to Question 5 have not been subjected to thematic analysis; rather, they have been reported in full in Table 7 so that the complete range of suggestions for supportive interventions can be examined.

3.3.1 | Staff shortages and overwork

The most prominent discussion point in December 2020 (T4) was that of staff shortages, which led to overwork, busier wards and an increased workload. These shortages were due to (a) redeployment, with some staff being sent to COVID-19 wards and others to wards that had been reconfigured to deal with increased patient demand due to the pandemic; and (b) staff absences due to self-isolation or illness resulting from overwork and/or COVID-19 infection. Staff shortages remained an issue in March 2021 (T5), caused by absenteeism related to self-isolation, sick leave, stress and overwork.

Some participants made explicit associations between the increased workload and a decline in their physical and mental health, as well as stating their belief that their additional effort was not being recognised. Others, however, described a scenario in which the wider team worked together effectively to deliver care.

3.3.2 | Redeployment and lack of training

Nurse redeployment to unfamiliar wards and areas, such as intensive care, was a significant issue in both December 2020 and March 2021. The pandemic caused unprecedented disruption to the NHS through ward reconfigurations, hospital reorganisation and additional procedures. Early career nurses (ECNs) felt they were working outside their area of competence, and some questioned the quality of care and safety in clinical areas. Newly qualified nurses who had been transferred to critical care units, to nurse COVID-19 patients, felt ill-equipped to deal with them. Redeployed nurses found the process distressing and demanding, and were concerned about suboptimal patient care because of their self-perceived inadequacy.

Participants were concerned that they had missed training days and that this might interfere with their progression as nurses. At both timepoints, participants lamented the absence of a preceptorship programme to ease their transition into qualified practice. There was also a perception that the lack of training contributed to overwork and fatigue, affecting the participants' work-life balance and recuperation time: 'With no specialist training, I worked so hard that I had no energy to even leave the bed let alone to go out for

TABLE 6 Themes and illustrative quotes from the survey data.

Theme	Illustrative quote(s)
Staff shortages and overwork	'Working during peak Covid times and other busy days on the ward where I'm too busy to sit down or get a lunch break' (Participant 18) 'We also still have a lot of staff absence and although now, as far as I know, it isn't Covid related, I feel like I have lost the capacity to empathise with their troubles, which makes me feel callous. There are 5 nurses who have basically been off for the whole year, and it's been so difficult without them, basically a doubled workload, that I'm permanently angry.' (Participant 28) 'I've been working in Intensive Care during the second Coronavirus wave. It has been physically and emotionally draining. Although I felt happy working in the ICU unit, I felt tired most of the time, and I felt that my salary didn't reflect the effort I was putting in.' (Participant 4) 'I was so busy I would miss my breaks anyway. Other staff would step in and help, with Drs helping me clean and turn patients' (Participant 14)
Redeployment and lack of training	'I was redeployed to a mental health unit when I first started my job because my ward was moved. So, I felt thrown in at the deep end. I was looking after kids that wanted to die which is not what I signed up for and I had no mental health experience.' (Participant 27) 'There are more non-ITU trained staff looking after ITU patients now due to re-deployments from other units and capacity reasons… I believe this might have had a detrimental impact in the quality of care given and the safety of our patients.' (Participant 4) 'As a PCCU nurse I have been redeployed to Adult Critical Care for a second time. This has been incredibly emotionally demanding and upsetting for me and my colleagues.' (Participant 23) 'The Covid outbreak has meant that my progression as a nurse has been limited as I have not been able to attend preceptorship meetings and a lot of training days have been delayed.' (Participant 21)
Lack of support and resources	'A day when I had too many complex patients (13) to see in 8 hours, after months of the same, and instead of being supportive when I asked for help and became upset, my manager was very confrontational and publicly humiliated me.' (Participant 28) 'I also found it difficult to be [in] situations where care appeared to be rationed where challenging decisions about ceilings of care were put in place.' (Participant 21) 'I've been feeling guilty as I haven't been able to give the care I wanted to give due to high patient workloads.' (Participant 14)
Emotional well-being	'Being exposed to positive patients, losing my patients to COVID-19 … getting COVID-19 myself and family and worrying about if my children will survive […] working in the designated Covid resus area and having a lot of patients die in one shift and there being nothing we could do for them.' (Participant 36) 'I struggled quite a bit during the peak of the pandemic, but now I think the effects are more longer term and chronic.' (Participant 13) 'Despite just going back to work after 2 weeks off I'm still exhausted. Covid has led to an exhaustion/burnout that feels impossible to recover from. It has also changed my baseline stress tolerance. So now, small stressors that wouldn't have affected me much a year ago cause dry mouth, racing heart, panic, and trembling hands. It's horrible.' (Participant 28) 'I feel there is no meaning to life at the moment. I work, eat, sleep, and repeat and I feel stressed going to work every day.' (Participant 24) 'It was the first week we opened our ITU as a Covid unit. An elderly patient got admitted to us and as he got wheeled in, I will never forget the look of fear on his face, looking around seeing us all in our PPE, seeing other patients intubated. Then the moment we had to intubate him, holding his shaking hand. My next shift he was gone and that hit me really badly as he was the first Covid patient I looked after who died. It has happened more times than I like to think since then, but that one has stayed with me and still upsets me a lot if my mind ever wanders back.' (Participant 59) 'Due to my work and persistence during the COVID-19 pandemic I was recognised for my caring nature and ability to work under pressure, I was promoted to senior nurse where I now run my own unit and complete the audits myself ensuring quality of care and documentation.' (Participant 60)
Concern about early career nurse retention	'I have considered leaving the nursing profession altogether a number of times this year and I know a lot of people feel the same.' (Participant 23) 'Undervalued, overworked and underpaid. It makes me sad as I know much of this sentiment is put down to Covid but in truth, for me, I blame the government for underfunding the NHS for so many years. So many of us stay in this job based on our goodwill and I'm not sure how much longer I can do that for, and this is from someone who has only done nursing for a year.' (Participant 23)
Leadership, guidance and direction	'More guidance and direction. All the doctors and senior staff were all shielding, leaving me to be in charge on my shift most of the time even though I was just 3 months post qualified before the pandemic.' (Participant 7) 'Regular debriefs, flexible schedules' (Participant 10) 'Being able to talk to her, having her understand what we're going through, being able to stand up to other higher up staff when they tried to push more beds to be open when it was impossible for us to staff the beds we already had open' (Participant 11) 'I have to say my manager was amazing and volunteered to go to adult ITU often.' (Participant 15)

Continues

TABLE 6 Continued

Theme	Illustrative quote(s)
Supportive work environment	'Protection for people of colour especially pregnant women. For [my] manager to be fully aware of the potential harm for pregnant women and to protect them.' (Participant 30) 'Not being allocated every shift to the side rooms, maybe having a few shifts where I didn't look after all the EoL patients. Or someone to debrief to after a few shifts.' (Participant 14) 'We had our ward psychologist, relax room, lots of people made cakes, brought in treats. Good leadership throughout was useful.' (Participant 44)
Psychological support	'Team huddles to open up on what we were going through. Counselling earlier on and easier to access. Consistent, better staffing and redeployed staff starting sooner than they did during the second wave; there was no support for weeks during the second wave. Luckily, I had a close group of friends I worked with, and they were my biggest support the past year.' (Participant 59)
A call to action	'I feel like there has been a good amount of offers for mental health support and counselling, but what seems to be lacking is the basic infrastructure (fair pay, adequate staffing ratios, shorter and more flexible working hours) to maintain a strong, healthy and equitable workforce. I see this as a long-term systemic issue, rather than a band aid.' (Participant 10) 'The truth is we are still in it; the support needs to be there later for when nurses feel that this has passed and how we process it. While we have to work it, many feel that once they open up, how can they keep it together to move on. The support shouldn't just go away once the pandemic ends it needs to be readily available for some time afterwards.' (Participant 56) 'I hope to see much more effort in the near future into offering healthcare staff the option to receive affordable, individual counselling sessions to prevent and deal with any PTSD that may come from this pandemic. As a profession there is this culture that we just 'get on with it' but my worry is that not getting help or providing tailored help to those who may need or want it will just further negatively impact nursing retention rates (despite the recent increase in nursing applicants!)'(Participant 33)

fresh air on my days off. NHS and Independent Sector nursing staff were not prepared for this …' (Participant 44).

3.3.3 | Lack of support and resources

Lack of leadership from senior staff was considered to have a negative effect on participants' working life at both timepoints. Participants stated that lack of guidance reduced confidence in their own abilities. The absence of regular induction, training and support sessions caused stress and anxiety sufficient for them to consider leaving the profession.

Participants accepted that their challenging work circumstances were largely due to the pandemic; yet there was still considerable frustration. According to some respondents, managers were too busy, or simply refused, to offer support. Participants identified scenarios in which strained communication compounded an already-challenging situation. Some ECNs raised broader concerns about the lack of government support and the perception that nursing is underpaid as a profession in the United Kingdom. They claimed that NHS staff had been overworked for many years and that this played into difficulties in dealing with the pandemic.

Some participants expressed the opinion that quality of care was being compromised by staff shortages, redeployment and patient load. They were concerned that this would eventually lead to safety issues: 'There was support out there but what was lacking is to consider our limited experience as nurses and how such big responsibilities left us not feeling safe in some situations.' (Participant 41). Participants commented that resources such as staff and oxygen were 'rationed', which influenced how many patients could survive. Such comments highlight the ethical dilemmas faced by ECNs during the pandemic.

3.3.4 | Emotional well-being

At both timepoints, participants mentioned psychological effects of working under the pandemic. In December 2020, some individuals expressed concern about working with an unfamiliar disease, as well as lack of knowledge about how to treat patients. They worried about the possibility of catching the virus and transmitting it to their families. They had concerns about new procedures such as PPE and the discomfort of wearing it for long shifts ('13–16 hours'). There was also a sense of inevitability and futility about the deaths of COVID-19 patients.

Participants frequently used language pertaining to emotional well-being when describing how it felt to work under the COVID-19 pandemic, including terms such as burnout, stress, pressure, anxiety, panic, work-life balance, PTSD and exhaustion. They also referred to longer term and cumulative effects of the pandemic on their mental and physical health. Participants attributed these negative outcomes to the type of work they were undertaking and to the cumulative guilt associated with the moral dilemmas they were facing. This theme was evident at both timepoints but emerged more strongly in March 2021. Examples of challenging scenarios included dealing with death, administering cardiopulmonary resuscitation (CPR) and talking to distressed relatives. The participants felt 'out of their depth' because they had little or no experience of such scenarios.

TABLE 7 Support mechanisms suggested by early career nurses.

Mechanisms related to work environment	Mechanisms related to leadership	Mechanisms related to psychological support
Adequate staffing ratio	Diversity of leaders and managers	Clinical supervision
Better system of rest breaks on the ward	Emotional support from managers	Counselling, specifically for PTSD due to the pandemic
Appropriate skill mix on shifts	More conversations with managers	Debriefing on difficult situations or bad shifts (one-to-one or in groups)
Flexible working	More support and understanding	Mindfulness breaks
A rotational programme for nurses to improve skills	More training opportunities	One-to-one support from psychologists specifically for ECNs
General NHS improvement in infrastructure	Regular check-ins	Peer support groups
Increase in pay/fair pay	Awareness among managers of risks of working with Covid for pregnant women and ethnic minorities	Well-being apps
Less redeployment	Visible managers	Someone to talk to
Mental health sick days option	Ongoing support	
Ongoing orientation		
Shorter days and breaks between shifts		
Well-being week prior to returning to regular ward after redeployment		

One paediatric nurse described three of their six adult patients dying during one ICU shift.

Although most nurses reflected on the more challenging aspects of working under the pandemic, a minority gave positive feedback. They stated that they had gained broader experience from scenarios such as redeployment and, with appropriate supervision, were able to learn new skills. They valued working as a team and making a difference to patients' lives.

3.3.5 | Effect on early career nurse retention

Several ECNs predicted that a serious repercussion of the pandemic would be the loss of early career nurses from the profession. The work environment was characterised by staff shortages and uncertainty surrounding colleagues and competence, which in turn hindered the participants' ability to function effectively as early career nurses. Participants were concerned that nurses were being pushed to leave the profession, due to overwork, low pay and underappreciation. Some expressed the opinion that their superiors expected them to 'just get on with it'. The overall experience was predominantly negative, leaving the ECNs feeling exhausted, disillusioned and unsure as to whether they wished to remain in the profession.

3.3.6 | Leadership, guidance and direction

Ward leadership and senior leadership within the organisation were regarded as critical, with poor leadership compounding emotional and psychological distress. ECNs highlighted the need for visible leadership, meaning that leaders would take on a share of the workload. Participants also felt that some of the negative effects of the pandemic could be mitigated if managers were to offer praise, acknowledgement and appreciation for the ECNs' hard work, as well as providing opportunities for check-ins and debriefings. Improved managerial communication was seen as vital (e.g. receiving information about policy changes in a timely manner). Some participants expressed the opinion that the ward manager should act as a mediator between nurses and more senior leadership within the organisation.

3.3.7 | Supportive work environment

Some participants expressed dissatisfaction with the work environment. These comments ranged from general requests for a greater level of support (e.g. extra staff, higher pay and more reassurance) to the identification of specific needs that were perceived as not being met (e.g. reducing the risk of COVID-19 for people of colour or introducing greater variety into an individual's work allocation). Even though many participants identified a *lack* of support, some respondents shared instances of effective management and teamwork.

3.3.8 | Psychological support

Participants reported using both internal and external resources to obtain emotional and psychological support. Nevertheless, they expressed the need for greater levels of support, often suggesting gestures that may seem relatively small, but were expected to make a significant difference to their well-being, for example, *'weekly texts to check in on mental health'* (Participant 19). They were clear about the types of internal support that they wished to receive in future

crisis situations, including better access to mental health services, more support from management and improvements in working conditions (e.g. pay, staff ratios, rest breaks and meetings).

3.3.9 | A call to action

Some participants expressed strong opinions that demonstrated a significant level of anger and frustration. For example, Participant 4 demanded a 'call to action' ('I think we need to speak out now before it's too late') and Participant 7 pointed blame at the government for not 'giving clear guidelines and offering support.' Participant 8 discussed their anger at being sent to the ITU without the proper training and without adequate pay and compensation: 'we were expected to go to ITU without any extra pay and put ourselves through an extremely stressful experience without any compensation. I felt like I didn't have any choice and was forced into it with no incentive or recognition of how different ITU was compared to the ward'.

3.3.10 | Future support mechanisms

Question 5 asked participants to identify support mechanisms that would be helpful in similar situations in the future. These strategies are summarised in Table 7. The comments highlight the need for ongoing support, tailored to the needs of ECNs. Some participants emphasised that the pandemic was not yet over and that nurses may experience symptoms of stress and PTSD for some time to come. It is clear from the participants' narratives that support mechanisms constitute a critical component of nurses' professional practice and can help smooth the transition of newly qualified nurses into the next stages of their careers.

4 | DISCUSSION

This study has improved understanding of the extent and persistence of PTSD symptoms in ECNs who started their careers during the COVID-19 pandemic. Analysis of the qualitative data about the nurses' stressful or traumatic experiences has shed light on the key issues giving rise to symptoms of PTSD. Finally, the study has identified practical recommendations to assist organisations in understanding and supporting the well-being of early career nurses.

The quantitative findings revealed that, for a significant proportion of the sample, PTSD symptoms were persistent across time, even after the peak of the pandemic had passed. The nurses' baseline resilience, as well as their perception of the quality of their work environment, were significant negative predictors of mean PCL-5 score. Furthermore, these two factors (work environment and resilience) showed a negative association with *persistently high* PCL-5 scores. A moderate positive correlation was observed between resilience and mean NWI-R score ($r = 0.30$, one-tailed $p = 0.05$), suggesting that the participant's innate level of resilience influenced their perception of the quality of their work environment.

The qualitative data complemented the quantitative findings by adding context and by providing detail regarding changes in the nurses' work environment due to the pandemic. The participants raised similar issues and concerns at both T4 and T5, which was consistent with the quantitative finding that, on average, the well-being measures were stable or worsened across these timepoints. This demonstrates that the nurses remained highly affected by the experience of working during the pandemic, with some individuals explicitly referring to long-term and cumulative effects of the situation on their well-being. This finding does not align with those of other recent longitudinal studies, which indicated a decrease in symptoms across time for early career nurses during the pandemic (Cobo-Cuenca et al., 2022) and psychological adaptation by nurses in general to the new challenges in their work environment (Sampaio et al., 2021).

Wider literature provides evidence of an association between the work environment and nurse retention (Mills et al., 2017), particularly in the case of early career nurses and especially if they perceive the level of clinical practice and patient care to be poor (Flinkman & Salanterä, 2015). Such an environment may cause nurses to experience moral distress and can lead to outcomes such as burnout, dissatisfaction and intention to leave (Aiken et al., 2012). During the pandemic, ECNs were faced with moral dilemmas associated with their inability to be the nurses they wanted to be—a consequence of an overwhelming workload and the requirement to 'ration' care (Cai Wah See et al., 2023; Carnesten et al., 2023). Our findings reiterate that this moral distress, together with exhaustion and a perceived lack of support, may have influenced the development and persistence of symptoms of PTSD. The burden of poor mental health has been identified to be greater in younger nurses, which could have implications for workforce retention (Gray et al., 2022). Supporting ECNs to recover from their experiences of the pandemic will be central to keeping them in the workforce.

The regression analysis showed a negative association between the perceived quality of the work environment and PCL-5 score, which is consistent with the qualitative finding that workplace factors, such as managerial support and teamwork, influenced ECNs' experiences of working under the pandemic. A key support strategy suggested by participants was the presence of knowledgeable, visible and proactive leaders, who could provide consistent emotional and practical guidance. This agrees with a recent study indicating that positive perceptions of organisational support motivate ECNs to continue working in a caring role (Son et al., 2022).

Guidance from clinicians—particularly mentors, preceptors and educators—is an important mechanism for supporting early career nurses, especially shortly after qualification (Cai Wah See et al., 2023). Individuals often lose access to social support systems established in higher education as they transition from being a student (Ankers et al., 2018). In the context of the pandemic, when clinical colleagues were unable to dedicate the usual time to new members of their teams and when preceptorship programmes were suspended, it is unsurprising that early career nurses looked

to ward and hospital-level leaders to support their integration into new work environments. However, it is likely that senior staff were also 'burnt out' by the relentless workload of the pandemic, making it harder for them to support ECNs. High levels of incivility, bullying and burnout have previously been reported by early career nurses, and such problems were exacerbated by the pandemic (Cai Wah See et al., 2023; Serafin et al., 2022).

The qualitative data indicated that ECNs were already struggling with the transition to qualified practice, and these difficulties were enhanced by negative perceptions of the workplace during the pandemic. Transition shock is an established concept that describes a reality shock when new nurses discover challenging differences between qualified practice and their experiences and perceptions of the role as students (Duchscher, 2009). The resulting disorientation is likely to be expressed in a variety of emotional, physical, socio-cultural and intellectual ways (Duchscher, 2009), as was also observed in our questionnaire data. The quality of the work environment, nurses' resilience and their access to social support are all predictors of transition shock (Cao et al., 2021). It is therefore likely that the participants in the present study would have been more susceptible to transition shock than ECNs who join the workforce in the absence of a crisis situation (Casey et al., 2021).

The participants' experiences were characterised by low self-confidence (especially when redeployed to new areas), a perceived lack of leadership and support, emotional distress and exhaustion. In general, newly qualified nurses tend to express doubt about their level of expertise, and it is likely that this behaviour was exacerbated in the unfamiliar context of the pandemic (Cai Wah See et al., 2023). The ECNs in the present study stated that they would have appreciated more guidance, both locally and nationally, on how to deal with the pandemic. They viewed leaders in the organisation as pivotal to their job satisfaction. Yet, there is also some evidence that the post-pandemic generation of graduate nurses report similar levels of perceived competence (or lack thereof) as nurses who qualified prior to the pandemic (Palese et al., 2022). Furthermore, caution should be exercised when considering early career nurses as a homogeneous group, as an individual's response is moulded by their character, prior experiences and expectations (Mills et al., 2017). Perceptions of self-competence vary globally across NGN groups. Upon graduation, individuals with previous experience in healthcare, as well as older students, assess their competence as higher (Kajander-Unkuri et al., 2020). Not all of the participants in the present study were negatively affected by working during the pandemic. This may, in part, reflect differences in prior experiences and in inherent characteristics. In particular, the quantitative data suggest that there may be value in using a baseline measurement of resilience when allocating individual support to early career nurses during their first year of practice.

The ECNs offered suggestions for how they should be supported in their future careers, particularly in crisis situations similar to the COVID-19 pandemic. Some of these strategies involve structural changes at an organisational or even governmental level and would require longer term planning and implementation. Others were less complex and could be implemented more easily, such as praise, regular acknowledgement from management and better systems for rest breaks. This study offers practical solutions that have the potential to enable this subset of the nursing workforce to feel more comfortable in the workplace. Given the potential for PTSD symptoms to persist over time, strategies should be implemented to enhance the well-being of ECNs, resulting in a more stable early career workforce that will ultimately promote better patient care.

5 | STRENGTHS AND LIMITATIONS

A clear limitation of this study was the small sample size, which was compounded by attrition, particularly at the later timepoints. Although the main variables of interest produced significant findings in linear mixed-effects regression models, the small sample limited the ability to investigate the influence of secondary variables, in particular demographic factors such as age and ethnic background. The small sample also ruled out the possibility of conducting analyses on a finer scale, for example, examining the effects of the different subscales of the NWI-R on the PCL-5 score. A related issue is that the present findings may only be applicable to a specific population and geographical location.

The PCL-5 checklist was introduced at timepoint T3 and baseline scores (prior to the pandemic) were not known. While most of the participants explicitly mentioned COVID-19 when asked to identify the stressful experience that prompted their response, it cannot be stated with certainty that the PCL-5 values observed in this study were elevated relative to pre-pandemic levels in early career nurses. More generally, there is a lack of normative data for the well-being measures used in this study in the case of early career nurses. Therefore, further work would be required to determine the precise effect of the pandemic on ECNs' mental well-being.

The outcomes of the qualitative analysis were not discussed with participants in order to check for validity. Although the insights emerging from the analysis were developed by the entire research team, the formal thematic analysis was conducted by a single researcher and may have been subject to bias.

A strength of the study was its design. By collecting data at three timepoints, incorporating both the first and second waves of the pandemic, valuable information was obtained regarding the temporal pattern of the well-being measures. Furthermore, the free-text questions in the survey allowed greater contextualisation of the data and offered insights into the working conditions of ECNs during the pandemic that could account for symptoms of PTSD. The free-text questions also encouraged participants to reflect upon the legacy of the pandemic for their mental health and to suggest short- and long-term solutions. These insights provide guidance on how to support the emotional and psychological needs of early career nurses, and ultimately, to increase the likelihood of retaining them within the profession.

6 | CONCLUSION

This study explored the experiences of early career nurses during the COVID-19 pandemic, with a particular focus on their psychological well-being. The questionnaire data indicated that 27% of participants suffered from persistent symptoms of PTSD while working during the height of the pandemic, which is a novel finding compared with other longitudinal studies. The nurses' baseline resilience, as well as their perception of the quality of their work environment, were significant negative predictors of PCL-5 score, indicating that a measurement of resilience may be useful for determining the appropriate level of support to provide to early career nurses. The qualitative data provided further context and insight into the challenges that the work environment posed for inexperienced nurses. Participants suggested a range of strategies that would have helped them during the crisis period, including visible, consistent and empathetic leadership, adequate training and a supportive work environment. Immediate implementation of some of the more simple interventions would provide early career nurses with rapid support. More complex support mechanisms should be given immediate consideration, with a view to implementation in the longer term. The context of the pandemic has highlighted the vulnerability of early career nurses in the workforce. This study contributes new knowledge to this topic by quantifying the psychological well-being of early career nurses at different timepoints during the pandemic and by suggesting support mechanisms that will be crucial for the retention of these nurses in the profession.

AUTHOR CONTRIBUTIONS

Judy Brook was involved in conceptualisation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, supervision, validation, visualisation, writing—original draft, writing—review and editing. Naomi Miller was involved in data curation, formal analysis, investigation, methodology, project administration, software, validation, visualisation, writing—original draft, writing—review and editing. Beverley Duguid was involved in data curation, formal analysis, investigation, methodology, visualisation, writing—original draft.

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CONFLICT OF INTEREST STATEMENT

There are no conflicts of interest for any of the authors.

DATA AVAILABILITY STATEMENT

Data are available on request from the corresponding author.

STATISTICAL STATEMENT

The authors have checked to make sure that our submission conforms as applicable to the Journal's statistical guidelines. There is a statistician on the author team: Dr Naomi Miller.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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