

# Cognitive appraisals and coping strategies of registered nurses in the emergency department combating COVID-19: A scoping review

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## Abstract

**Objective:** Explore the relevant evidence about stress-related cognitive appraisal and coping strategies among registered nurses in the emergency department (EDRNs) coping with the COVID-19 pandemic.

**Methods:** This scoping review followed the methodological framework of Arksey and O'Malley to map relevant evidence and synthesize the findings. We searched PubMed, EMBASE, CINAHL, Web of Science, and Scopus electronic databases for related studies from inception through February 2, 2022. This review further conducted study selection based on the PRISMA flow diagram and applied Lazarus and Folkman's Psychological Stress and Coping Theory to systematically organize, summarize, and report the findings.

**Findings:** Sixteen studies were included for synthesis. Most of the studies showed that the majority of EDRNs were overwhelmed by the COVID-19 pandemic. Depression, triaging distress, physical exhaustion, and intention to leave ED nursing were cited as major threats to their wellness. Additionally, comprehensive training, a modified triage system, a safe workplace, psychological support, promotion of resilience, and accepting responsibility may help EDRNs cope with pandemic-related challenges effectively.

**Conclusion:** The long-lasting pandemic has affected the physical and mental health of EDRNs because they have increased their effort to respond to the outbreak with dynamically adjusted strategies. Future research should address a modified triage system, prolonged psychological issues, emergency healthcare quality, and solutions facing EDRNs during the COVID-19 or related future pandemics.

**Clinical Relevance:** EDRNs have experienced physical and psychological challenges during the pandemic. The ED administrators need to take action to ensure EDRNs' safety in the workplace, an up-to-date triage system, and mental health of frontline nurses to provide high-quality emergency care for combating COVID-19.

## KEYWORDS

COVID-19 pandemic, emergency triage, registered nurses in the emergency department (EDRNs), stress and coping

## INTRODUCTION

### Challenge of COVID-19 outbreak in the emergency department

On March 11, 2020, the World Health Organization declared SARS-CoV-2 (COVID-19) a pandemic emergency. As of May 9, 2022, multiple COVID-19 waves had caused 515,192,979 human infections and 6,254,140 deaths worldwide (WHO, 2022). Emergency departments (EDs) have played an essential role in response to the COVID-19 outbreak (Quah et al., 2020). During the pandemic, the ED environment underwent significant turbulence, and the clinical care for COVID-19 cases in the ED was challenging (Lockett et al., 2021). Emergency transformation care includes fever screening, disposition of patients, and isolation care for confirmed and suspected COVID-19 patients (Quah et al., 2020). The ED setting had insufficient resources to manage the inevitable increase in demand for emergency healthcare (Alqu zar-Arb  et al., 2020; Casalino et al., 2022), and registered nurses in the emergency department (EDRNs) experienced a tension between their professional responsibility to patients and EDRNs' concerns for their own personal safety (Lockett et al., 2021; McKenna, 2020; Turale et al., 2020). Working in a totally new context with the physical strain of personal protective equipment (PPE) also led to overwhelming challenges (Hayirli et al., 2021; Liu, Luo, et al., 2020). Globally, the ED systems have nearly collapsed due to the burgeoning workload and psychological distress of frontline nurses (Hesselink et al., 2021; Nie et al., 2020).

### Emergency response to COVID-19 by EDRNs

EDRNs, as gatekeepers, are the frontline healthcare providers who view all patients as potentially infected with COVID-19. According to the literature, there was an association between the COVID-19 outbreak and the incidence of burnout, anxiety, and depression among frontline nurses (Hu et al., 2020; Lasalvia et al., 2021; Liu, Luo, et al., 2020). During the pandemic, EDRNs confronted extreme challenges in triaging patients and determining the order in which they receive treatment (Lockett et al., 2021). EDRNs must provide emergency care with PPE on a strict timeline for high-risk patients. PPE would impede communication with patients in triaging as well (Hayirli et al., 2021). Every time there was a greater record of COVID cases, the number of patients in the ED would increase but the workforce did not. Hence, for the unprepared and overburdened ED system, EDRNs have experienced more distress during primary care (Hesselink et al., 2021). Besides routine workload, EDRNs constantly should update their knowledge and skills about COVID-19 development to help them in emergency practice (Alzyoud et al., 2021). Moreover, EDRNs have faced ethical dilemmas when prioritizing care for confirmed cases with life-saving interventions instead of their own safety (Lockett et al., 2021). Until now, EDRNs have consistently paid attention to providing emergency nursing care with their expertise, and are fighting for

meaningful recognition as professionals on the frontline of this pandemic (Chipps et al., 2021).

### Psychological stress and coping framework during the pandemic

Compared with the pre-pandemic period, there were higher levels of emotional exhaustion/burnout among healthcare workers (HCWs) in ED (Rodriguez et al., 2020). For the prolonged period of time in COVID-19, EDRNs faced mental health problems resulting from their psychological distress (Hesselink et al., 2021; Nie et al., 2020). Fear is a significant factor influencing EDRNs' commitment to delivering safe and effective emergency care (Lockett et al., 2021). To the best of our knowledge, several studies investigated the fixed and infection-related factors linked to the distress of frontline HCWs (Sirois & Owens, 2020; Uphoff et al., 2021), but relatively fewer studies examined how modifiable factors focused only on EDRNs' stress and coping options during the COVID-19 pandemic. According to Lazarus and Folkman's transactional theory of stress and coping (Lazarus & Folkman, 1987), the primary appraisals of stress are concerned with the harm, threat, and challenge from environmental conditions; the secondary appraisals assess resources and coping strategies, which are crucial supplements to primary appraisals such as resilience and social support. Effective coping strategies could master the internal and external demands of a person-environment transaction. Lazarus and Folkman (1987) identify two styles of coping: problem-focused (making efforts to solve the problem) and emotion-focused (concentrating on one's own emotional experiences). During this long-lasting pandemic, EDRNs are unique health care assets to control the epidemic. Therefore, we need to focus more on EDRNs' psychological stress and their coping strategies to manage the suffering from the current outbreak and deal with similar attacks in the future.

This study aimed to investigate the stress-related cognitive appraisals and coping strategies of EDRNs during COVID-19, and to provide synthesis of evidence for improving their abilities and countermeasures to cope with the pandemic.

## MATERIALS AND METHODS

This study adopted a scoping review approach to map or explore the extent of a field of research by searching systematically. A scoping review approach also makes it possible to summarize and disseminate research findings. This scoping review followed the five stages from the Arksey and O'Malley methodological framework (Arksey & O'Malley, 2005).

### Stage 1: Identifying research questions

The following questions guided this scoping review of the stress-related cognitive appraisals and coping strategies of EDRNs during

the COVID-19 pandemic: What is the stress-related primary appraisal of EDRNs? What is the stress-related secondary appraisal of EDRNs? What is the problem-focused coping of EDRNs? What is the emotion-focused coping of EDRNs?

## Stage 2: Identifying relevant studies

After initial identification of key search terms developed by all authors of this study in consultation with expert librarians, we conducted a systematic search using PubMed, EMBASE, CINAHL, Web of Science, and Scopus electronic databases.

The inclusion criteria were as follows:

**Population:** We included studies focused on registered nurses working in the emergency department (EDRNs).

**Concept:** This study's concept was to report the stress-related perceptions, manifestations, and coping processes of EDRNs.

**Context:** The context for the review was that of EDRNs dealing with the COVID-19 pandemic.

**Types of sources:** The review included qualitative and quantitative research studies in English or Chinese.

A combination of the following controlled vocabularies (Emtree and MeSH) was used to search the databases: emergency ward, emergency health service, emergency service, hospital, emergency medical services, frontline nurse, licensed practical nurse, practical nurse, registered nurse, staff nurse, nurses, nursing, coronavirus disease 2019, severe acute respiratory syndrome coronavirus, COVID-19, and SARS-CoV-2. The search was last updated on February 2, 2022. The detailed search strategy can be found in Appendix S1. We excluded studies reporting the effects on non-emergency nurses, conference abstracts, editorials, dissertations, opinion pieces, and gray literature.

## Stage 3: Study selection

Two authors (CH and SF) independently screened citation titles and abstracts, then reviewed all potentially relevant articles. We considered any article reporting original research on EDRNs during COVID-19. If the two reviewers could not reach agreement on abstract or full article inclusion, an opinion was requested from a third reviewer (YH).

## Stage 4: Charting the data

Two reviewers (CH and SF) jointly developed a data-charting electronic form to determine variable selection. We then extracted the following data items independently: general data (title, year of publication, purpose of study, author's name, country, journal), methodological data (research design, participants, sampling method), participants' characteristics (gender, age, marital status, working experience, measurement), and results. We did not

perform a formal critical appraisal of primary studies for this scoping review.

## Stage 5: Collating, summarizing, and reporting the results

We conducted this review following the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines, which is an extension of scoping review (Page et al., 2021). The PRISMA flow diagram shows the process of identification, screening, and selecting the studies (Figure 1). To obtain a comprehensive understanding of the context of cognitive appraisals and coping strategies by EDRNs during the COVID-19 outbreak, we applied Lazarus and Folkman's Psychological Stress and Coping Theory (Biggs et al., 2017; Lazarus & Folkman, 1984) to systematically explore, organize, and map all the literature in this review. Hence, we reported the findings under the following headings: primary appraisal, secondary appraisal, problem-focused coping, and emotion-focused coping by EDRNs.

## RESULTS

All selected literature (16 studies) for this review met the inclusion criteria and revealed the deployment of three key research designs, including cross-sectional surveys (7 studies), qualitative approaches (8 studies), and action research (1 study). The reviewed findings were from developing and advanced healthcare systems and countries (or regions), including Australia, China, India, Indonesia, Iran, Italy, Taiwan, and Turkey. Table 1 outlines the general and methodological data of the reviewed studies, and the results of each study are reported in Appendix S1. Furthermore, we applied Lazarus and Folkman's Psychological Stress and Coping Theory (Biggs et al., 2017; Lazarus & Folkman, 1984) to map all reviewed literature in this study (Figure 2). There were four themes reported in the cognitive appraisals and coping strategies of EDRNs during the COVID-19 pandemic: primary appraisal, secondary appraisal, problem-focused coping, and emotion-focused coping (Table 2).

### Primary appraisal

During the pandemic, the overall prevalence of depression among EDRNs was 43.61% (An et al., 2020). EDRNs experienced anxiety (Cui et al., 2021), physical and psychological exhaustion (Mulyadi et al., 2022; Wei et al., 2020), and profound stress (Li et al., 2021; Yang et al., 2022), due to the radical workplace changes. They also suffered from burnout (Arcadi et al., 2021; Jose et al., 2020; Syapitri et al., 2022; Xu et al., 2021) and higher turnover (Ahorsu et al., 2022). After the COVID-19 outbreak, 48.2% of EDRNs intended to leave emergency nursing within 5 years (Cornish et al., 2021). To control COVID-19, EDRNs worried that triage

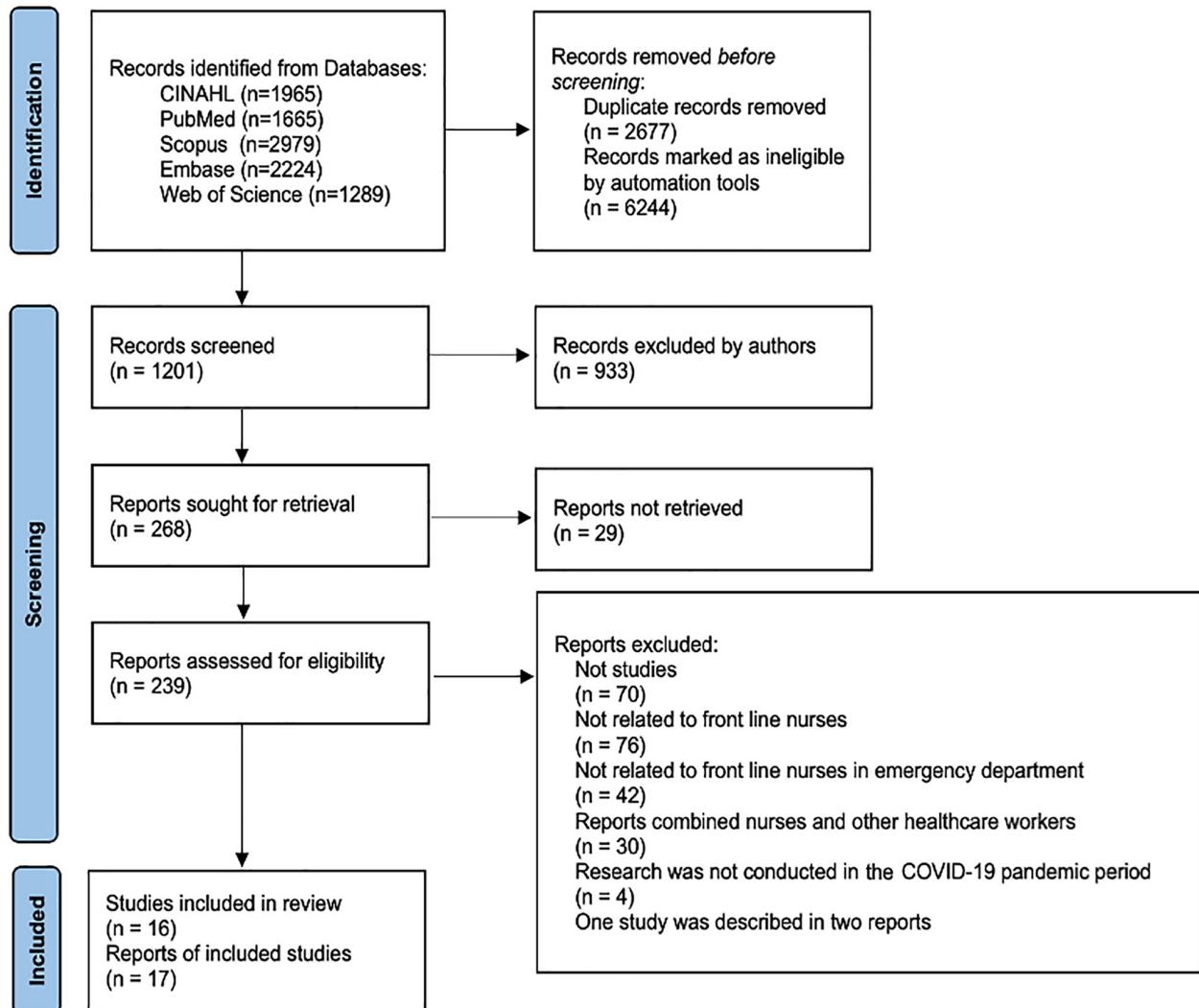


FIGURE 1 PRISMA flow chart of the scoping review

errors would lead to the spread of the pandemic or cross-infection (Hsu et al., 2021; Xu et al., 2021). The shortage of clear protocols for care, insufficient PPE, and poor separation of risk patients led EDRNs to work in a chaotic environment (Arcadi et al., 2021; Hsu et al., 2021; Kandemir et al., 2021). Insufficient human resources, heavy workload, and exhausting dressing and undressing PPE procedures altered EDRNs' perception of space and time, resulting in an enormous physical strain (Cinar et al., 2021; Jose et al., 2020; Xu et al., 2021).

## Secondary appraisal

The secondary appraisal to effectively handle and control the pandemic-related challenges was that EDRNs proactively updated comprehensive information about COVID-19 (Cinar et al., 2021; Hsu et al., 2021; Kandemir et al., 2021; Wei et al., 2020). EDRNs knew that the main barrier to triage management was the poor prevention and control knowledge of the epidemic because the situation

of the COVID-19 pandemic is unprecedented (Mulyadi et al., 2022; Syapitri et al., 2022; Xu et al., 2021). As part of their duty, EDRNs chose to stay with the high-risk patients, despite the fear of contracting the infection and passing it on to their loved ones (Arcadi et al., 2021; Li et al., 2021; Xu et al., 2021). EDRNs' motivation and willingness increased with their professional satisfaction and commitment (Cui et al., 2021; Kandemir et al., 2021). For EDRNs, their family, clinical fellows, and community support were sources of strength (Mulyadi et al., 2022; Syapitri et al., 2022; Wei et al., 2020). The inter-departmental cooperation allowed EDRNs to handle the dramatic changes better (Arcadi et al., 2021; Cornish et al., 2021; Hou et al., 2020; Mulyadi et al., 2022). Nurse managers could use group brainstorming to understand emergency nurses' stress and address their needs (Yang et al., 2022). Besides, the EDRNs' resilience in fostering a positive attitude towards COVID-19 would mitigate burnout and increase professional efficacy (Jose et al., 2020). This process of developing personal strategies to manage suffering from the pandemic might empower them to persevere and stay in their profession.

## Problem-focused coping

To enhance self-efficacy and reduce stress, EDRNs needed more comprehensive and practical training for the pandemic (Cui et al., 2021; Jose et al., 2020; Li et al., 2021; Wei et al., 2020; Yang et al., 2022). Understanding the COVID-19 development, infection chain, and footprint of confirmed cases could enable EDRNs to enhance infection control measures (Kandemir et al., 2021; Mulyadi et al., 2022). A modified triage by adding a COVID-19 screening sheet that aims to separate the emergency care to be provided might help EDRNs identify high-risk patients and implement quarantine properly (Syapitri et al., 2022; Xu et al., 2021). In the modified triage, if the chest imaging showed abnormal findings or the patient had respiratory symptoms or risk factors, he or she was quarantined immediately. Moreover, strict countermeasures to stop infection spreading include wearing masks, washing hands, and maintaining physical and social distance (Hsu et al., 2021; Mulyadi et al., 2022).

At an organizational level, the challenges between ED and other departments must be pursued through a commitment to strengthen multidisciplinary cooperation (Hou et al., 2020; Xu et al., 2021; Yang et al., 2022). The modified triage algorithm guided by the Centers for Disease Control and Prevention, prior preparation, and adequate PPE and human resources might provide EDRNs with a safe workplace (Cinar et al., 2021; Cornish et al., 2021; Syapitri et al., 2022). Furthermore, the government should provide explicit precautions and infection control education for people so patients and their families would cooperate more actively with medical staff, such as by accurately reporting the history of travel, occupation, contact, and cluster (Hou et al., 2020; Hsu et al., 2021). Additionally, changing lifestyle to ensure better sleep quality, hygiene, and healthy nutrition might be critical for the safety and well-being of EDRNs (Cinar et al., 2021; Mulyadi et al., 2022).

## Emotion-focused coping

Eleven of the sixteen studies included in this analysis revealed that psychological support might relieve EDRNs' emotional distress and tackle their compassion fatigue amidst the pandemic (Ahorsu et al., 2022; An et al., 2020; Arcadi et al., 2021; Cinar et al., 2021; Hsu et al., 2021; Jose et al., 2020; Kandemir et al., 2021; Li et al., 2021; Mulyadi et al., 2022; Syapitri et al., 2022; Yang et al., 2022). In the face of COVID-19-related adversity, EDRNs attempted to demonstrate resilience and psychological adjustment (An et al., 2020; Kandemir et al., 2021). Effective communication is essential to emotional resilience because such communication breeds positive emotions instead of negative ones and bridges the gap with patients or other professionals (Hou et al., 2020; Hsu et al., 2021; Li et al., 2021; Mulyadi et al., 2022; Yang et al., 2022). Besides, strengthening resilience may help EDRNs deal better with emotional exhaustion

and depersonalization, and achieve their personal accomplishments (Jose et al., 2020).

The sense of personal accomplishment makes EDRNs more engaged in their work and more motivated to enhance the quality of care (Ahorsu et al., 2022; Jose et al., 2020). As COVID-19 might put patients in the position of suffering from inevitable death, EDRNs accompanied them to express emotion, accept reality, experience loneliness, and share feelings (Arcadi et al., 2021; Syapitri et al., 2022). To handle grief and digest negative emotions, EDRNs' responsibility with empathy and compassion reinforce the degree of cohesion and collective solidarity (Ahorsu et al., 2022; Kandemir et al., 2021; Wei et al., 2020). Indeed, EDRNs' emotional expression and accepting responsibility may be natural parts of the nursing profession in tackling the pandemic (Cui et al., 2021; Li et al., 2021; Syapitri et al., 2022).

## DISCUSSION

This scoping review explored the pertinent published research on the perspectives of EDRNs on caring for patients during the COVID-19 outbreak. This review presented evidence from 16 studies. Since the pandemic has rapidly changed the ED environment and interrupted normal support systems, the 16 studies included in this analysis and the subsequent critical comparison of the evidence revealed frontline nurses' related cognitive appraisal and coping strategies during the health emergency. We should point out some strategies motivating the present study. First, our research team was able to reach an agreement to select empirical studies for this scoping review. Without this step, the search results may have been biased. Second, because our team includes a nurse practitioner, a triage nurse, registered nurses, and public health scholars, one major advantage is that we were able to discuss more comprehensive strategies to help EDRNs combat the COVID-19 pandemic from both clinical and public health perspectives. Similar strategies may be used for other infectious diseases in the future.

For the cognitive appraisals, EDRNs faced an overwhelming workload, especially given the long-lasting nature of COVID-19 (Jose et al., 2020; Liu, Luo, et al., 2020). EDRNs not only suffered from challenges of triaging, uncomfortable PPE, and infection risk but also had to carry out all the procedures precisely in a fast-paced setting (Liu et al., 2021; Mulyadi et al., 2022). EDRNs' psychological distress was unique and different from other frontline HCWs, especially the triage nurses (Al-Ashwal et al., 2020; Lasalvia et al., 2021; Liu, Zhai, et al., 2020; Nie et al., 2020). Previous studies have uncovered a difference in burnout risks for intensive care units and emergency nurses (Butera et al., 2021; Lin et al., 2021; Ruiz-Fernandez et al., 2020). Even though EDRNs must treat critically ill patients without delay, such as for emergency surgery, addressing acute myocardial infarction, or processing stroke patients, they have to administer a COVID-19 test to patients before all other procedures

TABLE 1 The general and methodological data of the reviewed studies

Author, year	Purpose	Country (or regions)	Journal	Study design
Ahorsu et al., 2022	Evaluation of the mediation roles of burnout and job stress in the association between fear of COVID-19 and mental health among EDRNs	Iran	Nursing Open	Cross-sectional survey
An et al., 2020	Evaluation of the prevalence of depressive symptoms and their correlates and the association between depression and quality of life in EDRNs	China	Journal of Affective Disorders	National, cross-sectional survey
Arcadi et al., 2021	Exploring the experience of Italian EDRNs engaged in caring for patients with COVID-19	Italy	Journal of Nursing Management	A hermeneutic approach by Cohen
Cinar et al., 2021	Evaluation of the perceived stress and affecting factors related to the pandemic of EDRNs	Turkey	Journal of Nursing Management	A cross-sectional descriptive design
Cornish et al., 2021	Exploring the intentions of the EDRNs to remain in or leave emergency nursing after the first year of the pandemic	Melbourne, Victoria, Australia	Emergency Medicine Australasia	Cross-sectional survey
Cui et al., 2021	Evaluation of the impact of COVID-19 on the mental health of EDRNs and identifying associated factors	China	Risk Management and Healthcare Policy	Cross-sectional survey
Hou et al., 2020	Exploration of the preparedness of the ED during the COVID-19 outbreak from the nurses' perspectives, providing a reference and basis for the ED's response to public health emergencies	China	Journal of Emergency Nursing	Husserl descriptive phenomenological approach and Colaizzi method
Hsu et al., 2021	Understanding the care experience and thoughts of EDRNs during the COVID-19	Taiwan	Healthcare	Qualitative research methods

Participants	Sampling method	Gender (females) n (%)	Age (years) mean (SD)	Marital status n (%)	Working experience (years) mean (SD)	Measurement
516 EDRNs	Convenience sampling	393 (76.16)	41.18 (8.24)	407 (78.9)	12.46 (10.35)	Fear of COVID-19 scale, Occupational Stress Inventory-Revised Edition, six subscales, Maslach Burnout Inventory Human Services Survey for Medical Professionals (fourth edition), Mental Component Summary under 12-Item Short-Form Health Survey
1103 EDRNs	Snowball sampling	1001 (90.8)	32.20 (7.61)	710 (64.4)	10.72 (8.3)	Patient Health Questionnaire-Chinese version (Depression), World Health Organization Quality of Life Questionnaire-Brief Version
20 EDRNs	Purposive sampling	7 (35)	32.8 (7.79)	6 (33)	9 (7.47)	NA
169 EDRNs	Convenience sampling	126 (74.4)	20-25: 40 (23.2%); 25-34: 72 (42.9%); ≥35: 57 (33.9%)	74 (43.5)	1-4: 59 (35.3%); 5-9: 37 (22.2%); ≥10: 72 (42.5%)	Perceived Stress Scale, An information form (27 questions) that includes the socio-demographic characteristics of nurses and the factors affecting their stress levels related to COVID-19
398 eligible responses from EDRNs	Snowball sampling	346 (86.9)	20-29: 114 (28.6%); 30-39: 127 (31.9%); 40-49: 88 (22.1%); 50-59: 58 (14.6%); >60: 11 (2.8%)	NA	0-5: 161 (41.60%); 6-10: 102 (26.36%); 11-15: 62 (16.02%); 16-20: 36 (9.30%); >20: 25 (6.46%)	The survey instrument includes 69 items in six sections: participant characteristics, life at home, the work environment, nursing practice, career intentions, and perceptions of nursing - with some adaptive questioning and free text options
453 EDRNs	Snowball sampling	437 (96.47)	33.15 (8.38)	312 (68.87)	11.33 (9.25)	Self-Rating Anxiety Scale, Perceived Stress Scale, Simplified Coping Style Questionnaire
12 EDRNs	Purposive sampling	9 (75)	30.42 (3.64)	9 (75)	<1: 2 (17%); 1-3: 2 (17%); 4-10: 5 (41%); >10: 3 (25%)	NA
16 EDRNs from a medical center	Purposive sampling	14 (87.50)	29.87 (3.50)	NA	7.25 (3.59)	NA

(Continues)

TABLE 1 (Continued)

Author, year	Purpose	Country (or regions)	Journal	Study design
Jose et al., 2020	Evaluation of the burnout and resilience among EDRNs of a tertiary care center during the pandemic	India	Indian Journal of Critical Care Medicine	Cross-sectional survey
Kandemir et al., 2021	Exploration of the changing roles and responsibilities, difficulties, feelings, and coping strategies of EDRNs during the COVID-19 pandemic	Turkey	Japan Journal of Nursing Science	A qualitative study using a phenomenological approach
Li et al., 2021	Evaluation of the knowledge, preparedness, and experiences of emergency nurses, emergency physicians, and paramedics in managing COVID-19	New South Wales, Australia	Australasian Emergency Care	Cross-sectional survey
Mulyadi et al., 2022	Exploring the experiences of EDRNs in selecting and triaging patients during the pandemic	Indonesia	Journal of Nursing Scholarship	Descriptive phenomenology
Syapitri et al., 2022	Explore the experience of nurses in carrying out the management of triage in the ED during COVID-19	Medan, Indonesia	Indonesian Nursing Journal of Education and Clinic	Qualitative research with a phenomenological approach
Wei et al., 2020	Understanding of the work experience of COVID-19 prevention and control among EDRNs	China	Nursing of Integrated Traditional Chinese and Western Medicine	A phenomenological research
Xu et al., 2021	Understanding the working experience of triage nurses in the ED during the COVID-19 epidemic	Shenzhen (Guangdong province, China)	International Emergency Nursing	Qualitative research methods
Yang et al., 2022	Evaluation of the effect of an emergency nurse-led stress-reduction project on reducing stress levels during the COVID-19 pandemic	Taipei, Taiwan	Journal of Nursing Management	An action research

(Hou et al., 2020). The dilemmas usually cause EDRNs mental distress, including depression, burnout, and secondary trauma. Besides dealing with these dilemmas, EDRNs showed their professional commitment and dedication to triaging and caring (Hou et al., 2020; Kandemir et al., 2021; Montgomery et al., 2021). Additionally, such personal resources as resilience, self-efficacy, and openness to collaboration are essential for frontline nurses to tackle stress, exhaustion, and frustrations during the pandemic (Jose et al., 2020; Mulyadi et al., 2022; Penacoba et al., 2021).

For coping strategies, the COVID-19 pandemic significantly affected the psychological symptoms of HCWs along with different

coping tendencies (Chen et al., 2022; Munawar & Choudhry, 2021). Effective coping strategies were associated with more perceived control and well-being (Cabarkapa et al., 2020; Dijkstra & Homan, 2016). In COVID-19-related challenges, EDRNs need to break the chain of transmission and effectively improve their emergency response capability and psychological state. Comprehensive training programs are fundamental to developing strategies for infection control and reducing the gap between knowledge and practice (Alzyoud et al., 2021; Wei et al., 2020; Yang et al., 2022). Through precisely identifying confirmed cases, a modified triage system to early screen for COVID-19 and prevent nosocomial infection would help safeguard the most



Participants	Sampling method	Gender (females) n (%)	Age (years) mean (SD)	Marital status n (%)	Working experience (years) mean (SD)	Measurement
120 EDRNs	Simple random sampling method	88 (73.3)	29 (4.44)	54 (45)	5.6 (4)	Maslach Burnout Inventory - Human Services Survey for Health Personnel, Connor-Davidson Resilience Scale-25
12 EDRNs	Purposive sampling	10 (83.33)	31.08 (6.36)	8 (66.67)	9.67 (7.34)	NA
159 ERNs	Convenience sampling	NA	NA	NA	15 years [IQR: 8-25]	Self-developed survey questionnaires examining the preparedness and experiences of healthcare workers during large-scale infectious diseases outbreaks
10 EDRNs	Snowball sampling	7 (70)	31.50 (3.95)	6 (60)	6.05 (2.83)	NA
10 EDRNs	Purposive sampling	NA	25-47 years	NA	2-16 years	NA
16 EDRNs	Purposive sampling	14 (87.50)	26-38 years	13 (81.25)	1-18 years	NA
10 ED triage nurses	Objective sampling method	7 (70)	32 (4.76)	NA	8.50 (4.93)	NA
EDRNs participating in the three-time survey were 160, 166, and 160, respectively	purposive sampling	NA	NA	NA	NA	Emergency nurses' COVID-19 stress questionnaire(stress levels, causes of stress, and needs), developed based on the nursing supervisors' previous SARS experience

valuable asset for pandemic management—the life and health of the medical teams (Kostadinov & Atliev, 2021; Syapitri et al., 2022). Moreover, adopting modified triage for medical referrals might contribute towards the preservation of emergency care system capacity.

Consistent with previous studies, we showed that a safe workplace under adequate awareness of the pandemic, self-care interventions, and mental health services constitutes a feasible strategy to reduce COVID-19-related stress (Callus et al., 2020; Catania et al., 2021; Rahman, 2022). Besides, timely psychological support crucially enhances frontline nurses' mental health and affects their ability to handle the pandemic and manage emergency patients (Chen et al., 2020; Goh et al., 2021; Liu, Zhai,

et al., 2020). Accepting responsibility and emotional expression could mitigate negative emotions and improve well-being among nurses (Montgomery et al., 2021). In the same vein, improving professional recognition has the potential to enhance EDRNs' engagement and increase their satisfaction (Chipps et al., 2021; Hsu et al., 2021).

There are several components of the stress-coping process pursued by EDRNs in dealing with COVID-19. Sufficient PPE and clear guidelines are vital factors in maintaining a safe workplace for combating the pandemic (Chen et al., 2020; Jose et al., 2020; Liu, Luo, et al., 2020). The worry and fear of contracting the virus and passing it on to family members were the most influential and

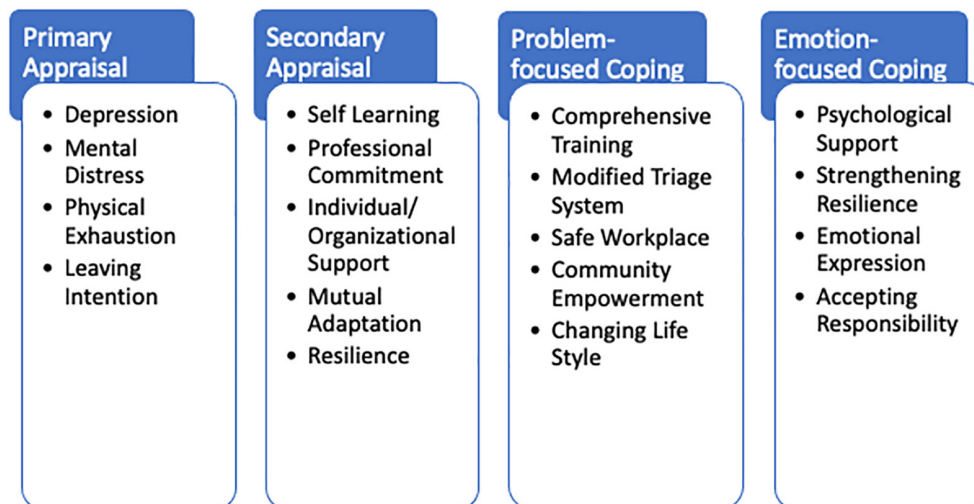


FIGURE 2 The map of stress and coping strategies among EDRNs combating COVID-19

predictive factors of anxiety, stress, and stress-coping tendencies (Cui et al., 2021; Garcia-Hedera et al., 2021). The uncertainty about the pandemic increased EDRNs' job stress, emotional exhaustion, and depersonalization symptoms, and decreased their sense of personal accomplishment (Ahorsu et al., 2022). Mainly, EDRNs with less work experience, lower educational background, less professional knowledge, those having children, and female nurses were under tremendous stress (Cinar et al., 2021; Wei et al., 2020; Xu et al., 2021). Their stress-coping capabilities were positively associated with the professional attitude, fear of contagion, emergency preparedness, and confidence in confronting the COVID-19 outbreak (Cui et al., 2021). Additionally, similar to previous studies, higher resilience was associated with lower anxiety, depression, and burnout among frontline nurses during COVID-19 (Hu et al., 2020; Penacoba et al., 2021; Sirois & Owens, 2020).

A review exploring the psychological impact of COVID-19 and other viral epidemics stated that the psychological implications to HCWs are variable, with several studies demonstrating increased risk of acquiring secondary trauma, depression, and anxiety; additionally, coping strategies varied among the contrasting socio-cultural settings and appeared to differ among doctors, nurses, and other frontline HCWs (Cabarkapa et al., 2020). Compared with related reviews, we provided profound insights into EDRNs' psychological status and coping strategies for combating COVID-19 (Alanazi et al., 2022; Cabarkapa et al., 2020; Pappa et al., 2020; Rahman, 2022). In correspondence with prior research, comprehensive training, a safe workplace, psychological support, and enhancing resilience may help frontline HCWs address challenges during the pandemic (Cabarkapa et al., 2020; Della Monica et al., 2022; d'Ettorre et al., 2021; Pappa et al., 2020).

This scoping review has emphasized the need for a modified triage system to recognize and respond early to high-risk patients, and improve patient safety during emergency care (Mulyadi et al., 2022;

Syapitri et al., 2022; Xu et al., 2021). At the organizational level, hospitals should consider offering free COVID-19 vaccines and testing for nurses and their families. This would reduce the psychological burden of EDRNs; hence, they can better commit themselves to work (Gualano et al., 2021; Xu et al., 2021). Actions to reduce intention to leave emergency care and illness resulting from psychological distress among nurses are vital to secure ED systems (Hesselink et al., 2021). Early mental health interventions, including psychological counseling, humanistic care, and social support, will relieve the frontline HCWs' negative perceptions and improve their well-being (Cui et al., 2021; Kandemir et al., 2021; Saladino et al., 2021; Sirois & Owens, 2020).

In terms of the evidence base, most of the studies reviewed were cross-sectional, providing only a snapshot of quantitative or qualitative methods exploring EDRNs' perceptions during COVID-19. This limits conclusions about the direction of causality in the stress and coping process. More research is needed to examine the potential long-term effects of stress among EDRNs using follow-up and time-lagged designs. These would provide more empirical support for coping strategies concerning pandemic-related distress. This review also identified available studies on stress-coping strategies by EDRNs during COVID-19, but the different approaches may allow searching for new findings. A limitation to the comprehensiveness of this study is that we excluded conference abstracts and gray literature, and included only published peer-reviewed literature. This scoping review approach also lacks the articulation of biases that might reduce the reliability of the outcomes; however, the synthesis was based on the most recent COVID-19 research. Additional studies could further explore the pandemic's lasting and dynamic impacts on the physical and psychological health of EDRNs and their family or co-workers. Furthermore, applying evidence-based coping strategies to reduce the severity of mental health problems for EDRNs in the early stage may prevent adverse short-term and long-term implications.

TABLE 2 The cognitive appraisals and coping strategies of EDRNs during the COVID-19

Author, year	Primary appraisal	Secondary appraisal	Problem-focused coping	Emotion-focused coping
Ahorsu et al., 2022	Fear of COVID-19. Job Stress. Burnout. Mental health problem	The financial implications associated with the consequences of burnout or mental illness among EDRNs alone are significant enough to threaten the smooth running of the health service	NA	Hospital authorities should endeavor to provide adequate PPE and other necessary resources to allay the fears of EDRNs in treating all kinds of patients during this COVID-19 pandemic
An et al., 2020	The overall prevalence of depression among ED nurses was 43.61%	EDRNs working in tertiary hospitals, engaging in clinical services for COVID-19 patients, and current smokers were significantly associated with a higher risk of depression	NA	Health authorities should organize regular screening targeting depression and develop preventive measures to alleviate the risk of depression. These strategies include providing timely support, online psychological counseling service, on-site psychiatric treatment for vulnerable nurses directly engaged in the treatment and care of COVID-19 patients
Arcadi et al., 2021	Fear of the unknown	Alteration in the perception of time and space. Attitude towards duty and responsibility	Change the meaning of 'to care,' the closeness, gestures of care and protection, and action despite the distance. Being an advocate to promote and protect the well-being of human beings	It is changing in roles and relationships of EDRNs. Trust, cohesion and mutual solidarity between the different professions are essential. Psychological support in association with emergency training prevents stress and helps tackle compassion fatigue
Cinar et al., 2021	The significant factors that affect the perceived stress levels of EDRNs were applying respiratory isolation, changing the way of life, not being able to access PPE, insufficient EDRNs, and thinking that COVID-19 will be transmitted to oneself	Training and up-to-date information were provided through online platforms	Effective infection control, an appropriate shift system, and increasing the number of EDRNs. A safe workplace for EDRNs. Changing EDRNs' lifestyle	Provide psychological counseling and guidance support services for health professionals. ED managers' planning regarding pandemic management is vital in reducing the perceived stress on frontline nurses. Proper communication, training with virtual simulations, adequate resources, and meeting the basic requirements of EDRNs

(Continues)

TABLE 2 (Continued)

Author, year	Primary appraisal	Secondary appraisal	Problem-focused coping	Emotion-focused coping
Cornish et al., 2021	A year after the onset of the pandemic, an alarmingly high proportion of EDRNs intended to leave emergency nursing. Non-clinical meetings essentially went online, and social interactions were severely constrained	PPE and physical distancing requirements have reduced the between-colleague connectedness. The rapid change without the opportunity for collaborative implementation processes significantly changed the ED working environment and interrupted standard support systems	Directed and strategic interventions to improve connectedness could assist retention of EDRNs. A positive workplace culture, expanded career opportunities, and nurses' well-being activities are essential strategic organizational interventions to retain EDRNs	NA
Cui et al., 2021	Being female, having less rest time, having children, lacking confidence in fighting the pandemic, regretting being a nurse, and fearing infection in the family were risk factors for reporting anxiety. EDRNs' perceived stress was associated with regretting being a nurse, not receiving emergency protection training, fear of infecting family members, and more night shifts. The double burden from both family and work made them more anxious	Confidence in fighting the spread of the disease. Professional attitudes. Attending infection prevention training	The online and offline comprehensive training could improve the occupational protection skills among EDRNs. Hospitals should ensure an adequate amount of EDRNs, the appropriate frequency of night shifts, and getting sufficient rest for EDRNs. The stress-coping capabilities were positively associated with the EDRNs with positive professional attitudes, trained in emergency preparedness, willingness to go to outbreak area for rescue, no regret of being a nurse, and no fear of infecting family members	A better understanding of EDRNs' anxiety, stress, and coping mechanisms can help design intervention and training programs
Hou et al., 2020	NA	In responding to the COVID-19 pandemic, multidisciplinary cooperation increased significantly, although the outbreak raised some problems of cross-departmental collaboration	The organizational preparedness in response to the COVID-19 outbreak contained the timely adjustment of ED functions, updating workflows, providing adequate supplies, and strengthening multidisciplinary cooperation to make EDRNs feel trustworthy and safe at work. To make patients and their families realize and cooperate actively with the medical staff, the government should make great efforts to publicize facts about understanding COVID-19 and the importance of self-protection	EDRNs need to make psychological adjustments to deal with moral distress, update the knowledge about COVID-19, make constructive communication with patients and their families, and deliver professional value to combat the outbreak

TABLE 2 (Continued)

Author, year	Primary appraisal	Secondary appraisal	Problem-focused coping	Emotion-focused coping
Hsu et al., 2021	Gatekeepers in epidemic prevention. There were difficulties with equipment and the environment. Conflicting emotions: worrying about being infected or transmitting the disease. EDRNs felt alienated and discriminated against	EDRNs made lots of efforts to manage patients' and family members' emotions and bear with anxiety and impatience from the public. An insufficient workforce of care. Additional tasks during the epidemic were non-emergency but essential, and they were even non-nursing tasks	A sufficient workforce of care and protective equipment was available. Provide epidemic prevention incentives by the government	EDRNs need effective support and empathy. The policies opened up and allowed childcare. The priority of childcare was assigned to frontline epidemic prevention staff. The respect and acknowledgment by the public towards healthcare workers are crucial supports for the EDRNs, such that they can increase their willingness to work and their self-worth
Jose et al., 2020	More than half of the EDRNs reported a high level of burnout in emotional exhaustion. Emotional exhaustion was reported significantly more among EDRNs who feared infecting family members, had no confidence in self-protection, and had felt poor safety in the workplace	EDRNs had a moderate to high level of resilience. The total score of resilience showed a significant negative relationship with emotional exhaustion and reduced professional efficacy. Personal accomplishment among EDRNs was significantly associated with gender (female) and the number of members in the household	More interventions are necessary to improve frontline nurses' mental health during a pandemic by building self-efficacy and resilience through practical training and infection control classes and providing sufficient social support online. To improve the workplace safety	A high level of resilience helps EDRNs manage stress and positively deal with challenges in life and decision-making, such as enhanced autonomy, personal growth, development optimism, and purpose in life. Effective interventions for improving resilience are needed to relieve nurses' burnout and workplace stressors
Kandemir et al., 2021	Increasing roles and responsibilities as an EDRN: partial replacement of physicians' roles, meeting all self-care needs of patients, informing and educating patients or their relatives, and protecting yourself and other patients	The motivation of EDRNs increased with their professional satisfaction and sense of commitment in this period; they felt like heroes because they were on the frontline in the fight against this disease, and they were proud of their professional. A spirit of professional commitment is a crucial factor in overcoming their challenges during the COVID-19 pandemic	Planning the supply of good quality equipment to reduce the discomfort from the PPE. Additional incentive payments are fairly made to healthcare professionals during the pandemic	Family and colleagues support. Positive thinking/belief. Positive feedback from patients. Monitoring nurses' mental problems and applying early intervention methods to prevent prolonged negative emotions

(Continues)

TABLE 2 (Continued)

Author, year	Primary appraisal	Secondary appraisal	Problem-focused coping	Emotion-focused coping
Li et al., 2021	The biggest challenge for EDRNs was around changes to workflow processes in the ED and the difficulty in isolating COVID-19 patients. There were challenging to keep up-to-date knowledge on the treatment and management of COVID-19. About 90% of EDRNs stated that they had not taken any annual leave. EDRNs had experienced racial or other discrimination at work due to the COVID-19 outbreak	The constantly evolving information about COVID-19. Varying levels of preparedness for COVID-19	To keep up-to-date with 11 categories of COVID-19 information: case definition, epidemiology, clinical presentation, laboratory testing, infection prevention and control measures, use of personal protective equipment, treatment & management, isolation practices, contact tracing, travel advice & restrictions, public health orders. Setting up the preparedness for COVID-19 on an individual, workplace, and national level, such as providing clear and timely communication, guidelines from the workplace/organization, COVID-19 related education, training, or instruction	To initiate staff debriefings and offer other psychological support services
Mulyadi et al., 2022	ED workplace changed radically. Mental exhaustion. Safe but uncomfortable with PPE	Be diligent in obtaining comprehensive information. Family and fellow of the EDRNs were a source of strength. Concerns regarding personal and family health. Spirit of collaboration	Straightforward and assertive education program. Adherence to public health policies. Community participation and empowerment in the control of COVID-19 outbreaks	Sharing updated information with co-workers could reduce EDRNs' fears. Seeking emotional support. Develop effective communication with patients and families
Syapitri et al., 2022	Fear of COVID-19 infection. The use of PPE is very uncomfortable to increase the sense of security. Social and working pressure. Physical and mental exhaustion. The available human resources were very insufficient	Proud to be at the forefront of the noble job and the recognized profession by the public. Strength of a team	Modifying the triage system by adding a COVID-19 screening sheet. Efforts to prevent transmission after getting off work. Provide the right resources in the right quantity and the right place at the right time. Human resource management is needed to ensure that the ER has human resources with adequate numbers and competencies	Give each other a sense of caring by providing moral and material support. Bring about meaningful recognition of nursing value in fighting against COVID-19. Nursing managers should provide support and praise

TABLE 2 (Continued)

Author, year	Primary appraisal	Secondary appraisal	Problem-focused coping	Emotion-focused coping
Wei et al., 2020	Inadequate knowledge of the epidemic. Increased workload and work stress. Physically and mentally exhausted	Gratitude for the support from the hospital and community	Epidemic control and prevention training. Planning for the epidemic prevention roadmap. Setting epidemic information and education billboard. Adjustment of emergency patients' admission process. Reserving and training more professional EDRNs	Food and supplies support by the enterprise. Tracking the physical and mental health status of EDRNs. Providing psychological counseling and support. Affirming the professional self-worth of the EDRNs
Xu et al., 2021	Fear of infection and transmission. Concern for the safety of oneself, family, and friends. The protective equipment was uncomfortable but increased the sense of security. High triage pressure from social and work fields. Physical and mental health of EDRNs was affected	A sense of occupational nobility, full of sense of accomplishment. Team strength in the ED	Increase human resources. Increase training, education, and emergency drills on infectious disease protection. Hospital administrators support the work posts of ED triage by establishing a "nursing task force" and other forms of support during an epidemic period to ensure the normal development of triage work	Pay attention to humanistic care: providing various types of support and care to frontline health care workers. Hospital managers should regularly affirm the value of triage nurses involved in the treatment of COVID-19 patients, give commendations, and further mobilize nurses' enthusiasm
Yang et al., 2022	Fear and uncertainty amid COVID-19. A heavy workload. Physical and emotional distress	Using group brainstorming strategies involving online surveys and group discussions in staff meetings could realize EDRNs' stress levels, causes of stress, and needs. Actively listening to EDRNs' experiences of COVID-19 and inviting them to participate in group brainstorming sessions can help develop interventions that meet their needs and enhance communications between nurses and leadership	Protection against infection by updating information and instructions for COVID-19 care, providing high-quality PPE and skincare products, maintaining a sterile environment, and using posters and small cards for nurses to educate and communicate with patients and families. Reducing heavy workload via providing hands-on training, setting nurses' work schedules no more than two consecutive days in the critical area, increasing paramedical personnel, and arranging more doctors to assist in the triage assignment	Reducing body-mind-social distress by arranging meal deliveries directly, giving incentives, enhancing communication between doctors and nurses, setting a forum for sharing experiences of COVID-19 care, and implementing friendship activities to establish a warm working environment. Interventions about self-compassion and compassion for others are necessary

## CONCLUSION

In substantiating stress-coping theory in our research, we found that EDRNs have faced various challenges in combating COVID-19. Indeed, EDRNs have suffered from stress. EDRNs also need practical strategies to manage and prevent further transmission. COVID-19 has changed triage practices in emergency care and profoundly affected nurses physically, mentally, and emotionally. This study indicates that EDRNs need comprehensive training, a modified triage system, a safe workplace, psychological support, and resources to strengthen their resilience. With that support, EDRNs may fulfill the demands of their increasing workloads and responsibilities on the frontlines to enhance emergency care quality during the current pandemic and beyond.

## CLINICAL RESOURCES

COVID-19 Information, Emergency Nurses Association <https://reurl.cc/VD854Y>

How to look after your mental health as a nurse <https://reurl.cc/p1LxLb>

## CONFLICT OF INTEREST

All authors declare no conflicts of interest.

## DATA AVAILABILITY STATEMENT

Because this research is a "Scoping Review," there are no data involved in this present study. No human subjects and/or animals were involved in the study. Therefore, this study does not fall into the category of human subjects research.

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## SUPPORTING INFORMATION

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

### Appendix S1

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