

HOSTED BY



Contents lists available at ScienceDirect

## International Journal of Nursing Sciences

journal homepage: <http://www.elsevier.com/journals/international-journal-of-nursing-sciences/2352-0132>

## Original Article

## Resilience of nurses at the epicenter of the COVID-19 pandemic in Lebanon

Mohamad Alameddine <sup>a, b, \*</sup>, Karen Bou-Karroum <sup>b</sup>, Wahida Ghalayini <sup>c</sup>, Firas Abiad <sup>c, d</sup><sup>a</sup> University of Sharjah, College of Health Sciences, Sharjah, United Arab Emirates<sup>b</sup> Faculty of Health Sciences, Department of Health Management and Policy, American University of Beirut, Beirut, Lebanon<sup>c</sup> Rafik Hariri University Hospital, Beirut, Lebanon<sup>d</sup> Department of General Surgery, American University of Beirut Medical Center, Beirut, Lebanon

## ARTICLE INFO

## Article history:

Received 18 April 2021

Received in revised form

9 June 2021

Accepted 3 August 2021

Available online 26 August 2021

## Keywords:

COVID-19

Lebanon

Nurses

Psychological

Resilience

## ABSTRACT

**Objective:** The study aimed to investigate the level and factors associated with the resilience of nurses practicing at the main COVID-19 referral center in Lebanon.**Methods:** The study utilized a cross-sectional survey design. Data were collected electronically in the spring of 2020 from 265 nurses. The questionnaire included five sections: demographic characteristics, job satisfaction, turnover intentions, exposure to violence, and resilience levels. Multiple linear regression was used to determine factors associated with resilience.**Results:** Results showed that the overall score of resilience among nurses was  $66.91 \pm 13.34$ . Most nurses were satisfied with their job (67.8%), and most nurses reported that it is unlikely for them to quit their present work in the coming year (76.2%). Over the last year, three-quarters of nurses (74.7%) reported being ever exposed to a form of occupational violence. The resilience of nurses was directly associated with job satisfaction and male gender and inversely associated with intention-to-quit and exposure to violence ( $P < 0.05$ ).**Conclusions:** Enhancing the resilience of nurses at the frontline of the COVID-19 pandemic improves their job satisfaction and retention and would help support the effectiveness and efficiency of care services. Nurse managers can regularly investigate the resilience of nurses and offer interventions that would strengthen it, especially at times of crisis.© 2021 The authors. Published by Elsevier B.V. on behalf of the Chinese Nursing Association. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## What is known?

- The COVID-19 pandemic has placed nurses under unprecedented pressure and has impacted nurses' social, emotional, and physical well-being.
- The stressors of COVID-19 may exceed nurses' coping skills and negatively influence job satisfaction leading to higher turnover intentions.

## What is new?

- We found that the level of nurse resilience was negatively associated with intention-to-quit and exposure to violence and positively associated with job satisfaction and male gender.
- Nurse managers should systematically investigate the resilience of nurses and offer interventions that would enhance it at times of crisis.

## 1. Introduction

The COVID-19 pandemic has exerted unprecedented pressure on the entire healthcare system and presented significant challenges to the nursing workforce [1]. Nurses who are directly involved in frontline care of COVID-19 patients often witness patients suffering, which could further amplify their stress and anxiety [1]. This exceptional situation has significantly impacted their

\* Corresponding author. University of Sharjah, College of Health Sciences, University City, Sharjah, P.O.Box: 27272, United Arab Emirates

E-mail addresses: [malameddine@sharjah.ac.ae](mailto:malameddine@sharjah.ac.ae) (M. Alameddine), [kkb06@mail.aub.edu](mailto:kkb06@mail.aub.edu) (K. Bou-Karroum), [wahidaghalayini@yahoo.com](mailto:wahidaghalayini@yahoo.com) (W. Ghalayini), [fa02@aub.edu.lb](mailto:fa02@aub.edu.lb) (F. Abiad).

Peer review under responsibility of Chinese Nursing Association.

mental and emotional well-being [2]. Literature has identified other sources of anxiety among nurses, including but not limited to long working hours, limited availability of personal protective equipment (PPE), fear of transmitting the virus, and the stress of making ethical and moral decisions relating to prioritization of care [3,4]. The persistent exposure to such stressors may exceed nurses' coping skills and impose long-term effects on their job satisfaction and work performance, consequently influencing their turnover intention [1]. In such difficult circumstances, personal resilience is a vital requirement for nurses' endurance.

Resilience, defined as the ability to overcome difficulties and cope successfully with stressful events [5], is receiving research attention due to its role in mitigating the effects of workplace stressors. As such, building resilience in risk-elevated and demanding settings has been proposed as an effective way to enhance employee well-being [6–8]. High resilience has been closely linked to reduced burnout and lower nurse turnover [6–9]. Additionally, research on resilience has highlighted its role in improving the quality of care and enhancing patient satisfaction [5]. Factors contributing to resilience include physiological factors (e.g., sympathetic nervous system), internal factors (e.g., self-efficacy, inner wisdom), external factors (e.g., clinical settings, social network), and demographic variables (e.g., age, years of experience) [9,10]. However, job satisfaction ranks among the most significant factors that contribute to resilience [11].

For nurses who work in stressful occupational settings, such as caring for patients during a pandemic, job satisfaction is critical to maintaining the quality of services delivered [12]. Nurses' job satisfaction is influenced by many factors such as individual characteristics, working environment, salary, recognition, and career advancement. These factors impact nurses' decisions to stay or quit their jobs through direct and indirect paths [13,14]. Recent evidence revealed that resilience is positively associated with job satisfaction, job retention, general well-being, and social support [15].

Multiple studies emphasized the significant relationships between nurses' well-being, resilience, and turnover intention [6–9]. Occupational stressors and high workload negatively influence nurses' physical, mental, and professional well-being and would eventually lead to poor work performance, low job satisfaction, and high turnover intention [16]. This would result in an additional workload for remaining nurses, setting up a vicious cycle for more burnout. This cycle is catalyzed by exposure to violence and mitigated by the degree of resilience.

Lebanon, a small Mediterranean country, has witnessed a surge of COVID-19 cases in the spring of 2020. Concurrently, Lebanon had an ongoing economic meltdown associated with unprecedented currency devaluation and an ongoing uprising demanding social justice. This study was conducted at a large public hospital, designated as the national epicenter of caring for COVID-19 patients.

This study aimed to investigate the resilience levels, job satisfaction, and turnover intention of nurses practicing at the major COVID-19 referral center in Lebanon. The study further aimed at determining the association between nurses' resilience, job satisfaction level, intention-to-quit, and exposure to violence.

## 2. Methods

### 2.1. Study design

In this study, a cross-sectional design was utilized to survey nurses practicing at a major public hospital and referral center in Lebanon. Data collection was carried out online. All registered and enrolled nurses at the hospital were approached to participate in the survey (total 308).

### 2.2. Measurements

The first segment of the questionnaire comprised socio-demographic characteristics including age, gender, marital status, level of education, and years of experience.

With permission from the authors, the Connor-Davidson Resilience Scale© (CD-RISC) was used to examine the resilience of nurses. The scale consists of the 25-items rated on a 5-point Likert scale (0 = not true at all and 4 = true nearly all the time) [17]. The items are divided across five dimensions: personal competence, high standards, and tenacity; trust in one's instinct, tolerance of negative effects, and strengthening effects of stress; positive acceptance of change and secure relationships; control; and spirituality [18]. Scores range from 0 to 100. The final score was achieved by adding up all the responses, with higher scores indicating higher resilience levels.

In this study, job satisfaction was assessed with one question, "How satisfied are you with your job?". Nurses were asked to rate their job satisfaction on a 5-point Likert scale (1 = highly dissatisfied and 5 = highly satisfied).

The questionnaire asked about nurses' turnover intention through a single question "In the coming 12 months, do you intend to quit?". This question was scored on a 4-point Likert scale (1 = very unlikely and 4 = very likely).

Nurses were also asked whether they had experienced occupational violence in their workplace in the past 12 months, "Have you been exposed to violence in the past 12 months?". Responses were (1 = Never, 2 = Ever/at least once).

### 2.3. Data collection

An online questionnaire was utilized for data collection in the Spring of 2020 during the COVID-19 pandemic. The questionnaire was pilot tested on ten nurses who recommended no significant modifications. The online survey was sent to all nurses at the hospital via their work email addresses. The email invitation included a consent form, information about the study, contact details of the research team, and an online link to the anonymous questionnaire. One week apart, three reminders were sent inviting nurses to participate in the study. The questionnaire took an average of 10 min to complete. A total of 265 nurses responded to the questionnaire.

### 2.4. Statistical analysis

The collected data were analyzed by using IBM SPSS software version 26. Descriptive statistics, including frequency, percentage, mean, and standard deviations, were generated to describe the various characteristics of responding nurses. Multiple linear regression analysis was conducted to identify factors associated with resilience. The explanatory variables included age, gender, marital status, years of experience, educational level, job satisfaction, intention-to-quit, and exposure to violence.

Respondents were grouped according to their resilience score: low resilience (scoring lower or equal to 25th percentile), moderate resilience (scoring above 25th percentile but less than 75th percentile), and high resilience (scoring above 75th percentile). Principal component analysis (PCA) with varimax rotation was used to analyze some factors underlying the scale [19,20]. An eigenvalue of 1 was used as a criterion for factor extraction. The internal consistency of the scale was examined by calculating Cronbach's  $\alpha$  coefficient. All analysis was carried at a 0.05 significance level.

### 2.5. Ethical considerations

Before the initiation of the study, ethical approval was obtained from the Institutional Review Board. An online consent was obtained from the participants. Participation was entirely voluntary, and no risks or harms were resulting from participation. Anonymity and confidentiality of the respondents were guaranteed as the online survey tool does not collect identifying information.

## 3. Results

A total of 265 complete responses were received, thus rendering an 86.0% response rate (265 out of 308). Table 1 presents the distribution of the participants across the various characteristics. The majority of respondents were females (64.9%), aged between 30 and 45 years old (75.8%), and ever married (68.7%). Responding nurses were equally divided between those who held a technical degree (52.7%) and those who held a university degree (47.3%). Three-quarters of respondents (74.3%) had more than ten years of experience. Furthermore, 67.8% of nurses were satisfied with their job, and 76.2% reported that it is unlikely for them to quit their present work in the coming year. Over the last year, three-quarters of nurses (74.7%) were ever exposed to a form of occupational violence.

The sample reported a mean resilience score of  $66.91 \pm 13.34$  (Table 1). The results indicate that 26.4% of participants were of low resilience (the first quartile with a mean of  $50.14 \pm 10.25$ ; 50.2% were of moderate resilience (second and third quartile with a mean of  $64.82 \pm 2.31$  and  $72.23 \pm 2.20$ , respectively); and a bit shy of a quarter of nurses (23.5%) were of high resilience (fourth quartile with a mean of  $82.42 \pm 13.34$ ). The mean item scores for each of the five factors of the CD-RISC were as follows: personal competence, high standards, and tenacity  $2.66$  ( $SD = 0.61$ ); trust in one's instinct, tolerance of negative effects, and strengthening effects of stress  $2.48$  ( $SD = 0.60$ ); positive acceptance of change and secure relationships  $2.75$  ( $SD = 0.67$ ); control  $2.88$  ( $SD = 0.62$ ); and spirituality  $2.97$  ( $SD = 0.76$ ).

Principal component analysis with Varimax rotation was conducted on the 25-items of the CD-RISC to uncover the final dimensions of the scale and validate the last instrument. The five

**Table 1**  
Characteristics of study participants ( $n = 265$ ).

| Characteristics      | <i>n</i> | %    | Resilience score ( <i>Mean</i> ± <i>SD</i> ) |
|----------------------|----------|------|--|
| Age(years)           |          |      |  |
| <30                  | 51       | 19.2 | 66.98 ± 18.04                                |
| 30–45                | 201      | 75.8 | 66.99 ± 11.96                                |
| ≥46                  | 13       | 4.9  | 65.23 ± 13.15                                |
| Gender               |          |      |  |
| Female               | 172      | 64.9 | 65.32 ± 12.78                                |
| Male                 | 93       | 35.1 | 69.83 ± 13.93                                |
| Marital status       |          |      |  |
| Not married          | 83       | 31.3 | 66.54 ± 16.67                                |
| Ever married         | 182      | 68.7 | 67.07 ± 11.56                                |
| Education level      |          |      |  |
| Technical            | 139      | 52.7 | 65.98 ± 13.59                                |
| Bachelor             | 92       | 34.8 | 68.57 ± 12.39                                |
| Masters              | 33       | 12.5 | 66.33 ± 14.96                                |
| Missing              | 1        |      |  |
| Years of experience  |          |      |  |
| <10                  | 68       | 25.7 | 66.01 ± 16.04                                |
| ≥10                  | 197      | 74.3 | 67.21 ± 12.30                                |
| Job satisfaction     |          |      |  |
| Dissatisfied         | 35       | 13.6 | 60.94 ± 14.26                                |
| Neutral              | 48       | 18.6 | 67.25 ± 12.93                                |
| Satisfied            | 175      | 67.8 | 68.38 ± 12.01                                |
| Missing              | 7        |      |  |
| Intention-to-quit    |          |      |  |
| Unlikely             | 189      | 76.2 | 68.36 ± 12.98                                |
| Likely               | 74       | 23.8 | 62.85 ± 13.55                                |
| Missing              | 2        |      |  |
| Exposure to violence |          |      |  |
| Ever                 | 198      | 74.7 | 63.19 ± 15.80                                |
| Never                | 67       | 25.3 | 68.18 ± 12.19                                |

**Table 2**  
The assignment method of independent variables.

| Independent variable | Assignment method                                   |
|----------------------|---|
| Age                  | <30 years = 0,0; 30–45 years = 1,0; ≥46 years = 0,1 |
| Gender               | Male = 0; Female = 1                                |
| Marital status       | Not married = 0; Married = 1                        |
| Education level      | Technical = 0,0; Bachelor = 1,0; Masters = 0,1      |
| Years of experience  | <10 years = 0; ≥10 years = 1                        |
| Job satisfaction     | Dissatisfied = 0,0; Neutral = 1,0; Satisfied = 0,1  |
| Intention-to-quit    | Unlikely = 0; Likely = 1                            |
| Exposure to violence | Ever = 0; Never = 1                                 |

factors accounted for 56.98% of the total variance and were comparable to those in the original factor structure of the CD-RISC reported by Ref. [1]. See Appendix A for eigenvalues and factor loadings for each item. The internal reliability of the scale was high (Cronbach's  $\alpha = 0.92$ ).

Table 2 details the assignment method of the independent variable in this study. As reported in Table 3, the multiple linear regression analysis showed that gender was associated with resilience, with males having higher resilience scores than females. Job satisfaction was also associated with resilience such that as job satisfaction increases, resilience scores increase. Another association was found between intention-to-quit and resilience, such that those who intend to quit were less resilient. Lastly, respondents exposed to violence over the last 12 months had lower resilience scores than those who were never exposed. This study showed no significant difference in resilience-based on respondents' age, marital status, educational level, and experience.

**Table 3**  
Multiple linear regression analysis of the resilience of nurses (n = 265).

| Variable             | B     | SE   | β     | t     | P      |
|----------------------|-------|------|-------|-------|--------|
| Constant             | 59.72 | 4.37 | –     | 13.65 | <0.001 |
| Gender               |       |      |       |       |        |
| Male                 | 5.82  | 1.66 | 0.21  | 3.51  | 0.001  |
| Job satisfaction     |       |      |       |       |        |
| Neutral              | 7.97  | 2.72 | 0.23  | 2.93  | 0.004  |
| Satisfied            | 8.06  | 2.26 | 0.29  | 3.57  | <0.001 |
| Intention-to-quit    |       |      |       |       |        |
| Likely               | –4.35 | 1.89 | –0.14 | –2.31 | 0.020  |
| Exposure to violence |       |      |       |       |        |
| Ever                 | –3.72 | 1.85 | –0.12 | –2.01 | 0.040  |

Note: R<sup>2</sup> = 0.13, F = 5.394, P < 0.001.

#### 4. Discussion

The study identified gender, job satisfaction, intention-to-quit, and exposure to violence as the main factors associated with resilience. Nurses in this study had a total average resilience score of 66.91 ± 13.34. Comparing these resilience scores with that of nurses in other contexts, reveals that surveyed nurses had relatively higher levels of resilience. For example, in South Korea, healthcare workers caring for patients during a Middle East Respiratory Syndrome outbreak displayed a mean resilience score of 61.5 ± 13.97 [21]. Nurses caring for COVID-19 patients in the Chinese Provinces of Sichuan had a mean resilience score of 62.16 ± 18.21 [22].

A deeper examination of the various constructs of resilience reveals that nurses showed higher levels of resilience on the “spirituality” construct with a mean item score of 2.97 over 4. This highlights the significant role of spirituality and religion among nurses in the Middle East Region in general and Lebanon in particular. Religion, spirituality, and personal beliefs could be a source of power and strength that could mitigate the negative stressors of work and life [23]. As such, nurses’ spiritual outlook could be a significant asset in coping with the COVID-19 pandemic. Likewise, nurses at this public hospital displayed relatively high levels of resilience on the “control” and “positive acceptance of change and secure relationships” constructs with a mean item score of 2.88 and 2.75, respectively. It appears likely that nurses also relied on personal and environmental resources to cope with the pandemic. Previous research on resilience showed that nurses’ sense of community reduces burnout outcomes and acts as an essential contributor to their resilience levels [24]. Likely, the phenomenon of people showing gratitude for the “masked heroes” in Lebanon and worldwide has raised nurses’ enthusiasm and harnessed their goal orientation in responding to the pandemic. Furthermore, the historical context of Lebanon, a country that has witnessed several episodes of war and civil unrest over the last few decades, may have contributed to enhancing the adaptability of the Lebanese population in general and of nurses in particular [25]. Perhaps one of the desirable spillover effects of going through crises is enhancing personal adaptation skills and refining internal resources to build patience and perseverance [26].

On the other hand, respondents scored relatively lower on trust in one’s instinct, tolerance of adverse effects, strengthening effects

of stress, personal competence, high standards, and tenacity, with a mean of 2.48 and 2.66, respectively. This suggests that nurses may have low self-efficacy. Enhancing nurses’ confidence in their capabilities and control over their functioning is crucial for nurses as they navigate crises [27]. This is supported by evidence suggesting that personal characteristics such as adaptability, control, coping, hope, self-efficacy, and skill recognition are significant contributors to high resilience among nurses [5–27]. Nurses will need extra support and empowerment from their line managers during a pandemic. They will also need to boost their self-efficacy through targeted training programs offered via online platforms to enhance flexibility and safety [1]. Likewise, nurse managers must dedicate the time to listen and respond to nurses’ suggestions and concerns during difficult times. Active listening is a practical intervention that will help attain psychological support and improve nurses’ morale [1].

Particular attention needs to be dedicated to nurses displaying lower levels of resilience, especially those falling in the lowest quartile. Identifying those most vulnerable nurses and offering them targeted support programs (e.g., stress management and coping techniques) would be essential for safeguarding their physical, mental and professional well-being and retention at the institution and the nursing labor market amid the challenging context [28]. Supporting poorly resilient nurses will also be necessary to protect the organizational culture from the negative emotions and outcomes that those nurses are likely to dissipate [26–28].

The mandate to enhance nurses’ self-efficacy, support them emotionally and develop their leadership skills is a national one that requires the collaborative efforts of the Ministry of Public Health, the Order of Nurses, and the Healthcare institutions. What has been learned at this hospital is likely to reflect the situation of nurses in all other hospitals dealing with COVID-19 patients. Designing online contextualized support programs with the potential of personalized one-to-one virtual support (if needed) is necessary to help frontline nurses enhance their emotional well-being and improve their retention at a time they are needed most. Since nurses are overworked and juggle multiple personal and professional responsibilities, it is essential to integrate the voice of nurses in the design of supportive tools and build an evaluative component that solicits feedback to ensure continuous improvement.

Concerning the factors contributing to resilience, although

gender did not affect resilience in previous studies [7,14,29], males in our study had higher resilience scores ( $Mean = 69.83$ ). This could be explained by the gender differences in coping mechanisms within the cultural context [30]. Traditionally, women are responsible for home and family and their paid work, in contrast to men's roles mainly linked to external work [31]. Women are negatively impacted by the gender differences in housework, employment, financial hardship, and childcare [30]. Female nurses were likely overwhelmed with family and work responsibilities during the pandemic, resulting in lower resilience. Therefore, organizations should develop gender-sensitive resilience enhancing interventions to support men and women in coping successfully with adversities [31]. Future research should examine in further detail the gender relations, causes, and manifestations among Lebanese nurses.

Despite the hospital's difficult and dangerous working environment, three-quarters of nurses indicated no intention-to-quit their current job within the next 12 months. Since resilience was significantly and negatively associated with intention-to-quit, interventions aiming to enhance nurses' resilience could be used as a strategy to reduce their turnover intention and ultimately improve working conditions [32,33]. For example, resilience training interventions using mindfulness and cognitive behavioral therapy (CBT) techniques strengthened resilience among nurses [34–36]. Likewise, work-based educational interventions were effective in improving nurses' resilience. Facilitating resilience workshops could also provide nurses with various resources and strategies that can help them adapt to challenging circumstances [37,38].

In this study, 74.7% of surveyed nurses reported being ever exposed to violence in the past 12 months. This is consistent with previous studies revealing the high level of nurses' exposure to workplace violence [39,40]. Unsurprisingly, nurses who were never exposed to violence had significantly higher resilience levels than reported exposure. Therefore, reducing workplace violence and supporting nurses who experience it is essential to retain nurses [41]. To be successful, hospital managers must ensure a safe work environment with the necessary policies and regulations to protect nurses [42]. While such interventions are essential at all times, they are particularly pivotal at times of public health emergencies and pandemics when physical and emotional fatigue is high, workloads are elevated, working conditions are complex and administrative support is suboptimal.

#### 4.1. Limitations

Several limitations were noted in this study. First, although the researchers have done their best to assure nurses that their participation would not influence their work relationship with the institution, they cannot rule out the presence of a social desirability bias. Second, although nurses' experience at the target hospital exemplifies that of nurses across the healthcare systems in Lebanon and elsewhere, the generalizability of the findings could be limited to hospitals with a similar context. Third, although the questionnaire has been reviewed by an expert panel and has been pilot tested, the authors cannot rule out the possibility of misunderstanding some of the questions in the survey questionnaire. Fourth, despite the usefulness of linear regression analysis, the authors acknowledge that this technique has few limitations. It only looks at linear relationships between dependent and independent variables, assuming a straight-line relationship. Lastly, the data collection happened when the hospital in general and the frontline

nurses, in particular, were unusually receiving an abundance of public material and moral support, which may have biased the response of nurses towards expressing higher intention to stay, job satisfaction, and resilience.

#### 4.2. Implications for nursing management

The present study highlights the significant role of nursing and hospital administrators in supporting nurses in their fight against COVID-19. Nurses' mental, emotional, and psychological health should be prioritized to decrease psychological distress, improve job satisfaction, and reduce turnover intentions among frontline nurses [1]. Nurse managers should promote self-care among frontline nurses by offering flexible work schedules, adequate breaks, and shorter duty hours; whenever possible. Social support from colleagues, family, and friends is also necessary to help alleviate the fears associated with the virus. Since resilience is associated with higher job satisfaction and lower turnover intention, it is essential to improve nurse resilience through empowering nurses, expanding their scope of practice, and enhancing their access to training and support resources and services.

Additionally, and mainly due to cultural pressures, the resilience of female nurses needs to be prioritized and strengthened. Ensuring a safe work environment and protecting nurses from exposure to violence is also essential to improving their resilience. On a final note, and despite the difficult circumstances, hospital administrators and health system stakeholders should grasp every opportunity to celebrate their nurses and incentivize them to be proper role models of resilience and for their excellent sacrifices.

### 5. Conclusion

Nurses' resilience is positively correlated with job satisfaction and male gender and negatively associated with intention-to-quit and exposure to violence. Enhancing the level of resilience of nurses thus has significant positive outcomes on the effectiveness and efficiency of patient service and would improve their retention when needed most. Ensuring a safe and violence-free practice environment would be essential to reap the full mitigating effect of resilience. Female nurses require targeted programs to enhance their resilience and well-being as they try to balance the multiple, and often competing, work and life responsibilities.

#### CRediT authorship contribution statement

**Mohamad Alameddine:** Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing- original draft preparation, Writing-reviewing and Editing. **Karen Bou-Karroum:** Software, Data curation, Writing- original draft preparation, Writing- reviewing and editing. **Wahida Ghalayini:** Visualization, Investigation, Supervision, Validation, Writing- reviewing and editing. **Firas Abiad:** Visualization, Investigation, Supervision, Validation, Writing-reviewing and editing.

#### Declaration of competing interest

The authors have declared no conflict of interest.

## Acknowledgment

The authors wish to extend their deep gratitude to the administration of the Rafik Hariri University Hospital and to all nurses working in the hospital for taking time off their busy schedule during a very difficult period to support this study.

## Appendices. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijnss.2021.08.002>.

## References

- Labrague LJ, de Los Santos JAA. Fear of COVID-19, psychological distress, work satisfaction and turnover intention among frontline nurses. *J Nurs Manag* 2021;29(3):395–403. <https://doi.org/10.1111/jonm.13168>.
- Zhang WR, Wang K, Yin L, Zhao WF, Xue Q, Peng M, et al. Mental health and psychosocial problems of medical health workers during the COVID-19 epidemic in China. *Psychother Psychosom* 2020;89(4):242–50. <https://doi.org/10.1159/000507639>.
- Braquehais MD, Vargas-Cáceres S, Gómez-Durán E, Nieva G, Valero S, Casas M, et al. The impact of the COVID-19 pandemic on the mental health of healthcare professionals. *QJM: Int J Med* 2020;113(9):613–7. <https://doi.org/10.1093/qjmed/hcaa207>.
- Ruiz-Fernández MD, Ramos-Pichardo JD, Ibáñez-Masero O, Cabrera-Troya J, Carmona-Rega MI, Ortega-Galán AM. Compassion fatigue, burnout, compassion satisfaction and perceived stress in healthcare professionals during the COVID-19 health crisis in Spain. *J Clin Nurs* 2020;29(21–22):4321–30. <https://doi.org/10.1111/jocn.15469>.
- Hart PL, Brannan JD, De Chesnay M. Resilience in nurses: an integrative review. *J Nurs Manag* 2014;22(6):720–34. <https://doi.org/10.1111/j.1365-2834.2012.01485.x>.
- Heritage B, Rees CS, Osseiran-Moisson R, Chamberlain D, Cusack L, Anderson J, et al. A re-examination of the individual differences approach that explains occupational resilience and psychological adjustment among nurses. *J Nurs Manag* 2019;27(7):1391–9. <https://doi.org/10.1111/jonm.12820>.
- Ang SY, Uthaman T, Ayre TC, Mordiffi SZ, Ang E, Lopez V. Association between demographics and resilience - a cross-sectional study among nurses in Singapore. *Int Nurs Rev* 2018;65(3):459–66. <https://doi.org/10.1111/inr.12441>.
- Ren Y, Zhou Y, Wang S, Luo T, Huang M, Zeng Y. Exploratory study on resilience and its influencing factors among hospital nurses in Guangzhou, China. *Int J Nurs Sci* 2018;5(1):57–62. <https://doi.org/10.1016/j.ijnss.2017.11.001>.
- Manomenidis G, Panagopoulou E, Montgomery A. Resilience in nursing: the role of internal and external factors. *J Nurs Manag* 2019;27(1):172–8. <https://doi.org/10.1111/jonm.12662>.
- Turner SB, Kaylor SD. Neuman systems model as a conceptual framework for nurse resilience. *Nurs Sci Q* 2015;28(3):213–7. <https://doi.org/10.1177/0894318415585620>.
- Öksüz E, Demiralp M, Mersin S, Tüzer H, Aksu M, Sarıkoc G. Resilience in nurses in terms of perceived social support, job satisfaction and certain variables. *J Nurs Manag* 2019;27(2):423–32. <https://doi.org/10.1111/jonm.12703>.
- Yu X, Zhao Y, Li Y, Hu C, Xu H, Zhao X, et al. Factors associated with job satisfaction of frontline medical staff fighting against COVID-19: a cross-sectional study in China. *Front Public Health* 2020;8:426. <https://doi.org/10.3389/fpubh.2020.00426>.
- Masum AK, Azad MA, Hoque KE, Beh LS, Wanke P, Arslan Ö. Job satisfaction and intention to quit: an empirical analysis of nurses in Turkey. *Peer J* 2016;4:e1896. <https://doi.org/10.7717/peerj.1896>.
- Zheng Z, Gangaram P, Xie H, Chua S, Ong SBC, Koh SE. Job satisfaction and resilience in psychiatric nurses: a study at the Institute of Mental Health, Singapore. *Int J Ment Health Nurs* 2017;26(6):612–9. <https://doi.org/10.1111/inm.12286>.
- Yu F, Raphael D, Mackay L, Smith M, King A. Personal and work-related factors associated with nurse resilience: a systematic review. *Int J Nurs Stud* 2019;93:129–40. <https://doi.org/10.1016/j.ijnurstu.2019.02.014>.
- Guo YF, Luo YH, Lam L, Cross W, Plummer V, Zhang JP. Burnout and its association with resilience in nurses: a cross-sectional study. *J Clin Nurs* 2018;27(1–2):441–9. <https://doi.org/10.1111/jocn.13952>.
- Connor KM, Davidson JR. Development of a new resilience scale: the Connor-Davidson resilience scale (CD-RISC). *Depress Anxiety* 2003;18(2):76–82. <https://doi.org/10.1002/da.10113>.
- Mealer M, Schmiege SJ, Meek P. The Connor-Davidson Resilience Scale in critical care nurses: a psychometric analysis. *J Nurs Meas* 2016;24(1):28–39. <https://doi.org/10.1891/1061-3749.24.1.28>.
- Abdi H, Williams LJ. Principal component analysis. *WIREs Comp Stat* 2010;2(4):433–59. <https://doi.org/10.1002/wics.101>.
- Jolliffe IT, Cadima J. Principal component analysis: a review and recent developments. *Phil Trans Math Phys Eng Sci* 2016;374(2065):20150202. <https://doi.org/10.1098/rsta.2015.0202>.
- Son H, Lee WJ, Kim HS, Lee KS, You M. Hospital workers' psychological resilience after the 2015 Middle East respiratory syndrome outbreak. *Soc Behav Pers* 2019;47(2):1–13. <https://doi.org/10.2224/sbp.7228>.
- Huang L, Wang Y, Liu J, Ye PF, Cheng BC, Xu HY, et al. Factors associated with resilience among medical staff in radiology departments during the outbreak of 2019 novel coronavirus disease (COVID-19): a cross-sectional study. *Med Sci Mon Int Med J Exp Clin Res* 2020;26. <https://doi.org/10.12659/msm.925669>. e925669-1.
- Weathers E. Spirituality and health: a middle eastern perspective. *Religions* 2018;9(2):33. <https://doi.org/10.3390/rel9020033>.
- Prati G, Pietrantonio L. Stress and resilience among first responders. *Cooperative Libraria Universitaria Editrice Bologna: CLUEB*; 2009.
- Ammar W, Kdoh O, Hammoud R, Hamadeh R, Harb H, Ammar Z, et al. Health system resilience: Lebanon and the Syrian refugee crisis. *J Glob Health* 2016;6(2):020704. <https://doi.org/10.7189/jogh.06.020704>.
- Turner SB. Resilience of nurses in the face of disaster. *Disaster Med Public Health Prep* 2015;9(6):601–4. <https://doi.org/10.1017/dmp.2015.70>.
- Guo YF, Cross W, Plummer V, Lam L, Luo YH, Zhang JP. Exploring resilience in Chinese nurses: a cross-sectional study. *J Nurs Manag* 2017;25(3):223–30. <https://doi.org/10.1111/jonm.12457>.
- Vesel L, Waller K, Dowden J, Fotso JC. Psychosocial support and resilience building among health workers in Sierra Leone: interrelations between coping skills, stress levels, and interpersonal relationships. *BMC Health Serv Res* 2015;15(Suppl 1):S3. <https://doi.org/10.1186/1472-6963-15-s1-s3>.
- Salam A. Predictors of resilience among registered nurses at three private hospitals in South Lebanon [Accessed on, <https://scholarworks.aub.edu.lb/bitstream/handle/10938/11091/b18930293.pdf?sequence=1>]. [Accessed 21 July 2021].
- Avis W. Gender equality and women's empowerment in Lebanon [Accessed on, <https://reliefweb.int/sites/reliefweb.int/files/resources/175-Gender-Equality-and-Womens-Empowerment-in-Lebanon.pdf>]. [Accessed 21 July 2021].
- Hirani S, Lasiuk G, Hegadoren K. The intersection of gender and resilience. *J Psychiatr Ment Health Nurs* 2016;23(6–7):455–67. <https://doi.org/10.1111/jpm.12313>.
- Yu M, Lee H. Impact of resilience and job involvement on turnover intention of new graduate nurses using structural equation modeling. *Jpn J Nurs Sci* 2018;15(4):351–62. <https://doi.org/10.1111/jjns.12210>.
- Delgado C, Upton D, Rans K, Furness T, Foster K. Nurses' resilience and the emotional labour of nursing work: an integrative review of empirical literature. *Int J Nurs Stud* 2017;70:71–88. <https://doi.org/10.1016/j.ijnurstu.2017.02.008>.
- Joyce S, Shand F, Tighe J, Laurent SJ, Bryant RA, Harvey SB. Road to resilience: a systematic review and meta-analysis of resilience training programmes and interventions. *BMJ Open* 2018;8(6):e017858. <https://doi.org/10.1136/bmjopen-2017-017858>.
- van der Riet P, Levett-Jones T, Aquino-Russell C. The effectiveness of mindfulness meditation for nurses and nursing students: an integrated literature review. *Nurse Educ Today* 2018;65:201–11. <https://doi.org/10.1016/j.nedt.2018.03.018>.
- Wei H, Roberts P, Strickler J, Corbett RW. Nurse leaders' strategies to foster nurse resilience. *J Nurs Manag* 2019;27(4):681–7. <https://doi.org/10.1111/jonm.12736>.
- McDonald G, Jackson D, Wilkes L, Vickers MH. A work-based educational intervention to support the development of personal resilience in nurses and midwives. *Nurse Educ Today* 2012;32(4):378–84. <https://doi.org/10.1016/j.nedt.2011.04.012>.
- McDonald G, Jackson D, Wilkes L, Vickers MH. Personal resilience in nurses and midwives: effects of a work-based educational intervention. *Contemp Nurse* 2013;45(1):134–43. <https://doi.org/10.5172/conu.2013.45.1.134>.
- Alameddine M, Mourad Y, Dimassi H. A national study on nurses' exposure to occupational violence in Lebanon: prevalence, consequences and associated factors. *PLoS One* 2015;10(9):e0137105. <https://doi.org/10.1371/journal.pone.0137105>.
- Alameddine M, Kazzi A, El-Jardali F, Dimassi H, Maalouf S. Occupational violence at Lebanese emergency departments: prevalence, characteristics and associated factors. *J Occup Health* 2011;53(6):455–64. <https://doi.org/10.1002/ajoc.10113>.

- 10.1539/joh.11-0102-0a.
- [41] van Heugten K. Resilience as an underexplored outcome of workplace bullying. *Qual Health Res* 2013;23(3):291–301. <https://doi.org/10.1177/1049732312468251>.
- [42] Wei CY, Chiou ST, Chien LY, Huang N. Workplace violence against nurses: prevalence and association with hospital organizational characteristics and health-promotion efforts: cross-sectional study. *Int J Nurs Stud* 2016;56:63–70. <https://doi.org/10.1016/j.ijnurstu.2015.12.012>.