

# Investigating the Resilience of Nurses During the COVID-19 Pandemic A Cross-Sectional Survey from Lebanon

Mohamad Alameddine (✉ [mohamad.alameddine@mbru.ac.ae](mailto:mohamad.alameddine@mbru.ac.ae))

Mohammed Bin Rashid University of Medicine and Health Sciences College of Medicine

<https://orcid.org/0000-0002-2299-1242>

**Karen Bou-Karroum**

American University of Beirut

**Wahida Ghalayini**

RHUH: Rafik Hariri University Hospital

**Firas Abiad**

RHUH: Rafik Hariri University Hospital

---

## Research

**Keywords:** COVID-19, nurses, resilience, job satisfaction, retention

**Posted Date:** February 10th, 2021

**DOI:** <https://doi.org/10.21203/rs.3.rs-168997/v1>

**License:**  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

---

# Abstract

*Background:* The COVID-19 pandemic placed frontline nurses under great pressure, influencing their physical and psychological wellbeing. Resilience has been recognized as a protective factor in times of crisis.

*Purpose:* Investigate the degree of resilience, and associated factors, of nurses practicing at a major public hospital and COVID-19 main referral center in Lebanon.

*Methods:* A cross-sectional online survey investigating nurses' demographic characteristics, job satisfaction, turnover intentions, exposure to violence, and resilience levels. Multiple linear regression was used to determine factors related to resilience.

*Findings:* The study had a response rate of 86% and a mean resilience score of 66.91 (SD = 13.34). Nurses' resilience is positively associated with job satisfaction and male gender and negatively associated with intention to quit and exposure to violence.

*Discussion:* Enhancing the resilience of nurses improves their job satisfaction and retention at time of crisis, and would help support the effectiveness and efficiency of care services.

## Background

The corona virus disease 2019 (COVID-19) pandemic has exerted unprecedented pressure on the entire healthcare system and presented major challenges to the nursing workforce [1]. Being at the forefront of patient care, nurses are exposed to increased patient volume, heavy workload, and traumatic events. This exceptional situation has significantly impacted their mental and emotional well-being [2]. Published literature revealed a significant association between the COVID-19 pandemic and mental health issues such as burnout and anxiety among frontline healthcare workers [3–4]. Evidence revealed that nurses have the highest anxiety levels among healthcare professionals, ranging from 15–92% [1–5–6]. That is because the severity of, and susceptibility to, the COVID-19 pandemic is creating fear among nurses and is resulting in emotional distress [1]. In addition, 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]. 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 [7–8]. The persistent exposure to such stressors may exceed nurses' individual coping skills and impose long term effects on their job satisfaction and work performance, and consequently, influence their turnover intention [1]. In such difficult circumstances, personal resilience is a vital requirement for nurses' endurance [1].

Resilience is receiving research attention due to its role in mitigating the effects of workplace stressors. It is defined as the ability to overcome difficulties and cope successfully with stressful events [9]. As such,

building resilience in risk-elevated and demanding settings has been proposed as an effective way to enhance employee well-being [10–11]. High resilience has been closely linked to reduced burnout and lower nurse turnover [10–12]. Additionally, research on resilience has highlighted its role in improving quality of care and enhancing patient satisfaction [9]. Published literature has identified several factors that contribute to resilience including 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) [12–13]. However, job satisfaction ranks among the most significant factors that contribute to resilience [14].

For nurses who work in stressful occupational settings, job satisfaction is key to maintain the quality of services delivered. Satisfaction with job can positively influence the productivity and success of nurses at work [14]. In addition, the job satisfaction of frontline nurses is closely associated with the pandemic prevention and control [15]. 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 [16–17]. Previous studies revealed that resilience is positively associated with job satisfaction, job retention, general well-being, and social support [18].

The emergence of COVID-19 has caused various challenges worldwide. Lebanon, a small Mediterranean country, has witnessed a surge of COVID-19 cases in the Spring of 2020. At the time of the study (Spring of 2020), Rafik Hariri University Hospital (RHUH) was the national epicenter of caring for COVID-19 patients, Lebanon had an ongoing economic meltdown associated with unprecedented currency devaluation, and the country had an ongoing uprising demanding social justice and denouncing corruption. It is also worthwhile noting that RHUH is a poorly resourced public hospital, that was suffering from multiple operational and financial challenges long before the pandemic. Knowing that nurses at RHUH are already a high-risk group, it is important to assess their resilience, job satisfaction, and turnover intention during the COVID-19 pandemic. The study further aims at determining the association between nurses' resilience, job satisfaction level, intention to quit, and exposure to violence, as well as identifying potential interventions that support nurses' well-being.

Literature emphasizes the significant relationships between nurses' wellbeing, resilience and turnover intention [10–12]. It is evident that the various occupational stressors and high workload in the healthcare sector negatively influence the physical, mental and professional wellbeing of nurses [19]. This in turn would lead to poor work performance and decreased quality of care, low job satisfaction, and eventually, high turnover intention [19]. This would result in additional workload for remaining nurses, setting up a vicious cycle for more burnout. This cycle is catalyzed by exposure to violence and mitigated by degree of resilience. Personal resilience mitigates the effects of job dissatisfaction and reduces turnover intention, whereas exposure to violence decreases job satisfaction, reduces resilience, and enhances intentions to quit job.

## Methods

# Study design

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

## Survey instruments

A structured questionnaire consisting of five segments was utilized. The first segment comprised demographics characteristics such as age, gender, marital status, level of education, and years of experience. The second segment examined resilience using the Connor-Davidson Resilience Scale<sup>®</sup> (CD-RISC). Permission and license were obtained from Dr. Davidson to use the copyrighted measure for this study. The scale consists of twenty five questions rated on a 5-point Likert scale (0 = not true at all and 4 = true nearly all the time) [20]. The items are divided across five dimensions: emotional strength, goal orientation, belief in a higher power, adaptability, and belief in one's leadership. 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 the third segment, nurses were asked to rate their job satisfaction on a 5-point Likert scale (1 = highly dissatisfied and 5 = highly satisfied). The fourth segment of the questionnaire asked about nurses' intention to quit the current workplace in the coming 12 months on a 4-point Likert-scale (1 = very unlikely and 4 = very likely). Finally, nurses were asked whether they had experienced occupational violence in their workplace in the past 12 months (1 = Never, 2 = Ever/at least once).

## Data collection and analysis

The data were collected using an online survey during March-April 2020 amid the COVID-19 pandemic. A pilot test was firstly conducted with 10 nurses to validate the questionnaire. 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. Three reminders, one week apart from each other were sent inviting nurses to participate in the study. The questionnaire took an average of 10 minutes to complete. A total of 265 nurses responded to the questionnaire.

The collected data were analyzed by using IBM SPSS software version 26. Descriptive statistics including frequency, percentage, mean, and standard deviations analyses to describe the various characteristics of responding nurses. Multiple linear regression analysis was conducted to identify the predictors of resilience. The independent 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) was used to analyze a number of factors underlying the scale. 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 0.05 significance level.

## **Ethical considerations**

Prior to the initiation of the study, ethical approval was obtained from the Institutional Review Board at the American University of Beirut (SBS-2019-0455). An online consent was obtained from the participants after explaining the aim of the study prior to filling the survey. Participation was entirely voluntary, and there were no risks or harms resulting from participation. Anonymity and confidentiality of the respondents was guaranteed as the online survey tool does not collect identifying information such as name, IP address or email address. All data were held secure and only accessed by the research team.

## **Results**

A total of 265 nurses responded to the questionnaire thus rendering an 86% response rate. Table 1 presents the distribution of the participants across the various characteristics. The majority of respondents were females (64.9%), aged between 30–45 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%). As for years of experience, three quarters of respondents had more than 10 years of experience. The results indicated that 67.8% of nurses were satisfied with their job and 76.2% reported had no intention to quit the present workplace in the coming year. The questionnaire also surveyed nurses on their exposure to violence in the past 12 months. Results reveals that three quarters of responding nurses were exposed to a form of violence at their workplace, at least once, over the last 12 months.

Table 1  
 Characteristics of study participants  
 (N = 265)

	N	%
Age		
Below 30 years	51	19.2
30–45 years	201	75.8
46 years and older	13	4.9
Gender		
Female	172	64.9
Male	93	35.1
Marital Status		
Not married	83	31.3
Married	182	68.7
Education Level		
Technical	139	52.7
Bachelor	92	34.8
Masters	33	12.5
Years of Experience		
Less than 10 years	68	25.7
More than 10 years	197	74.3
Job satisfaction		
Dissatisfied	35	13.6
Neutral	48	18.6
Satisfied	175	67.8
Intention to quit		
Unlikely	198	76.2
Likely	74	23.8
Exposure to violence		
Ever	198	74.7

	N	%
Never	67	25.3

The sample reported a mean resilience score of 66.91 (SD = 13.34), suggesting that nurses had a low level of resilience. The results indicate that 26.4% of participants were of low resilience (scoring within 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  $82.42 \pm 13.34$ ).

Principal component analysis with Varimax rotation was conducted on the 25-items of the CD-RISC. Only one factor showed an eigenvalue above 1. The five factors accounted for 56.98% of the total variance. Factor 1 (13.1%) relates to emotional strength; factor 2 (13%) relates to goal orientation; factor 3 (11%) relates to higher power; factor 4 (10.6%) relates to adaptability; and factor 5 (9.28%) relates to belief in one's leadership. Factor loadings of the 25 items ranged from 0.361 to 0.825. The five factors in our analysis were comparable to those in the original factor structure of the CD-RISC reported by [20]. Table 2 displays eigenvalues and factor loadings for each item. The internal reliability of the scale was high ( $\alpha = 0.92$ ).

Table 2  
Factor loading analysis of the CD-RISC

	<b>Emotional Strength</b>	<b>Goal orientation</b>	<b>Higher power</b>	<b>Adaptability</b>	<b>Belief in one's leadership</b>
Not easily discouraged by failure (RS16)	<b>.692</b>				
When things look hopeless, I don't give up (RS12)	<b>.668</b>				
Think of self as strong person (RS17)	<b>.564</b>			.304	.347
Can handle unpleasant feelings (RS19)	<b>.528</b>				.367
Close and secure relationships (RS2)	<b>.523</b>		.323	.460	
Tend to bounce back after illness or hardship (RS8)	<b>.398</b>		.379		
Pride in your achievement (RS25)	<b>.394</b>	.329	.386		
You work to attain your goals (RS24)		<b>.713</b>	.307		
I like challenges (RS23)		<b>.709</b>			
In control of your life (RS22)		<b>.665</b>			
Know where to turn for help (RS13)		<b>.653</b>			
You can achieve your goals (RS11)		<b>.469</b>	.334	.368	
Best effort no matter what (RS10)		<b>.438</b>	.363	.425	
Sometimes fate or God can help (RS3)			<b>.825</b>		
Things happen for a reason (RS9)			<b>.800</b>		
Past success gives confidence for new challenge (RS5)		.313	<b>.460</b>		
See the humorous side of things (RS6)				<b>.718</b>	
Can deal with whatever comes (RS4)		.309	.332	<b>.623</b>	

	<b>Emotional Strength</b>	<b>Goal orientation</b>	<b>Higher power</b>	<b>Adaptability</b>	<b>Belief in one's leadership</b>
Able to adapt to change (RS1)	.364			<b>.558</b>	
Under pressure, focus and think clearly (RS14)				<b>.484</b>	.464
Have to act on a hunch (RS20)					<b>.730</b>
Make unpopular or difficult decisions (RS18)	.486				<b>.554</b>
Strong sense of purpose (RS21)	.366	.387			<b>.525</b>
Prefer to take the lead in problem solving (RS15)	.312			.362	<b>.480</b>
Coping with stress strengthens (RS7)	.301		.347		<b>.361</b>
Percentage of variance explained	13.1%	13%	11%	10.6%	9.28%
Extraction Method: Principal Component Analysis.					
Rotation Method: Varimax with Kaiser Normalization.					

Mean scores for each of the five factors of the CD-RISC were as follows: higher power 2.97 ( $\pm 0.76$ ), goal orientation 2.88 ( $\pm 0.62$ ), adaptability 2.75 ( $\pm 0.67$ ), emotional strength 2.66 ( $\pm 0.61$ ), and belief in one's leadership 2.48 ( $\pm 0.60$ ).

Multiple linear regression analysis showed that gender, job satisfaction, intention to quit, and exposure to violence were the main predictors of resilience. Gender was a significant predictor of resilience, with males having higher resilience scores compared to females. Job satisfaction is also a significant predictor of resilience such that as job satisfaction increases, resilience scores increase. Another significant association was found between intention to quit and resilience such that those who intend to quit were less resilient. Lastly, respondents who were exposed to violence over the last 12 months had lower resilience scores compared to those who were never exposed. Findings from this study showed no significant difference in resilience based on respondents' age, marital status, educational level, and years of experience (Table 3).

Table 3

Association of RISC scores with the various characteristics in the study population, as examined by simple and multiple linear regressions. (N = 265).

	Resilience score (mean $\pm$ SD)	$\beta$ (95%) <sup>§</sup>	Adjusted $\beta$ (95%) <sup>§*</sup>
Age			
Below 30 years	66.98 $\pm$ 18.04	1	1
40–55 years	66.99 $\pm$ 11.96	0.01 (-4.12,4.15)	-1.11 (-5.07,2.84)
56 years and older	65.23 $\pm$ 13.15	-1.75 (-9.94,6.44)	-3.32 (-11.13,4.49)
Gender			
Female	65.32 $\pm$ 12.78	1	1
Male	69.83 $\pm$ 13.93	<b>4.50 (1.16,7.85)</b>	<b>5.82(2.55,9.09)</b>
Marital Status			
Not married	66.54 $\pm$ 16.67	1	-
Married	67.07 $\pm$ 11.56	0.53 (-2.96,4.01)	-
Education Level			
Technical	65.98 $\pm$ 13.59	1	-
Bachelor	68.57 $\pm$ 12.39	2.45 (-1.07,5.98)	-
Masters	66.33 $\pm$ 14.96	0.32 (-4.77,5.40)	-
Years of Experience			
Less than 10 years	66.01 $\pm$ 16.04	1	-
Less than 10 years	67.21 $\pm$ 12.30	1.20 (-2.50,4.90)	-
Job satisfaction			
Dissatisfied	60.94 $\pm$ 14.26	1	1
Neutral	67.25 $\pm$ 12.93	<b>6.89 (1.45,12.33)</b>	<b>7.97(2.61,13.34)</b>
Satisfied	68.38 $\pm$ 12.01	<b>8.02 (3.60,12.45)</b>	<b>8.06 (3.62,12.50)</b>
Intention to quit			
Unlikely	62.85 $\pm$ 13.55	1	1

<sup>§</sup>  $\beta$  represents the linear regression coefficients. Significant  $\beta$  ( $\alpha$ 0.05) are bolded.

\*Variables that were significant in the simple linear regression were entered in the multiple regression model. ( $R^2$  of the multiple regression model = 0.13)

	Resilience score (mean ± SD)	$\beta$ (95%) <sup>§</sup>	Adjusted $\beta$ (95%) <sup>§*</sup>
Likely	68.36 ± 12.98	<b>-5.51 (-9.27,-1.76)</b>	<b>-4.35(-8.07,-0.64)</b>
Exposure to violence			
Never	68.18 ± 12.19	<b>1</b>	<b>1</b>
Ever	63.19 ± 15.80	<b>-4.97 (-8.64,-1.30)</b>	<b>-3.72 (-7.38,-0.07)</b>
§ $\beta$ represents the linear regression coefficients. Significant $\beta$ ( $\alpha$ 0.05) are bolded.			
*Variables that were significant in the simple linear regression were entered in the multiple regression model. ( $R^2$ of the multiple regression model = 0.13)			

## Discussion

To the best knowledge of the authors, this was the first study to investigate the resilience of frontline nurses fighting against COVID-19 in Lebanon. The study revealed that surveyed nurses had a low resilience level and identified gender, job satisfaction, intention to quit, and exposure to violence as the main predictors of resilience.

Nurses in this study had a low level of resilience, with a total average score of 66.91 (SD = 13.34). However, it is worth noting that this major governmental hospital was the leading COVID-19 testing and treatment center in the country, which had an ongoing economic crisis coupled with anti-government protests. Comparing the resilience scores of nurses in this study with nurses in other contexts during a public health emergency tells a different story. A study examining resilience of health care workers in South Korea after the 2015 Middle East respiratory syndrome outbreak, displayed a mean resilience score of 61.5 (13.97) [21]. During the COVID-19 pandemic, nurses practicing in the Chinese Provinces of Wuhan and Sichuan had a mean resilience score of 64.86 and 62.16; respectively [22–23]. Therefore, despite the deteriorating economic and political conditions in Lebanon, combined with the poorly resourced setting, nurses at RHUH were more resilient during the COVID-19 pandemic compared to nurses in the much better-resourced contexts of China and South Korea.

A deeper examination of the various constructs of resilience, reveals that nurses showed higher levels of resilience on the “higher power” construct with a mean 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 [24]. As such, nurses’ spiritual outlook could be a significant asset in coping with the COVID-19 pandemic. Likewise, nurses at RHUH displayed relatively high levels of resilience on the “goal orientation” and “adaptability” constructs with a mean 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 important contributor to their resilience levels [25]. Similarly, collective self-efficacy, which refers to the efforts of a group and their perception of their ability to accomplish a major task, is a key predictor of resilience [25]. Certainly, the standing ovation and the phenomenon of people showing gratitude for the “masked heroes” in Lebanon and worldwide have raised the enthusiasm of nurses and harnessed their goal orientation in responding to the pandemic. Furthermore, the historical context of Lebanon as a country that have 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 [26]. Perhaps one of the desirable spillover effects of going through crises is the enhancement of personal adaptation skills and the refinement of internal resources that contribute to building up of patience and perseverance [27].

On the other hand, respondents scored relatively lower on belief in one’s leadership and emotional strength, 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 own functioning is therefore crucial for nurses as they navigate crises. This is supported by evidence suggesting that personal characteristics such as adaptability, control, coping, hope, self-efficacy, and skill recognition are major contributors to high resilience among nurses [9–28]. Nurses will need extra support and empowerment by their line managers during a pandemic. They will also need to boost their self efficacy through targeted training programs that will both enhance their knowledge and skill in dealing with the pandemic and boost their leadership skills. Such training programs could be offered via online platforms to offer flexibility to learner and in order to maintain social distancing [1]. Likewise, psychotherapy and psychological treatment seem necessary in this challenging context. Due to the limited access to in-person mental health services, hospital managers could provide alternative approaches such as telepsychiatry. During the difficult times, nurse managers ought to dedicate the time to listen and respond to nurses’ suggestions and concerns. Active listening is a simple, easy and practical intervention that will be helpful in attaining psychological support and improving nurses’ morale [1].

Perhaps most disconcerting in this study was that 70 nurses (26.4%) had low resilience scores with an average mean of 50.14. These low scores may be attributed to stressful working conditions, exposure to violence and difficult life circumstances. Those nurses may also have been overwhelmed by the pandemic and may not have been able to handle the stress. Consequently, they are at higher risk of developing physical and psychological problems and would indeed be at a higher risk of turnover not only from the target hospital but also from the nursing labor market [29]. 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 wellbeing, as well as their retention at the institution and the nursing labor market amid the challenging context [30]. 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 [27]; [30]. The mandate to enhance the self-efficacy of nurses, 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 RHUH is likely to be the case of nurses in all

other hospitals dealing with COVID-19 patients in the country. 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 wellbeing and improve their retention at a time they are needed most. Since nurses are overworked and are juggling multiple personal and professional responsibilities, it is essential to integrate the voice of nurses in the design of supportive tools and to 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 [11–17–31], males in our study had significantly higher resilience scores ( $M = 69.83$ ) as compared to females ( $M = 65.32$ ). This difference can be explained by the gender differences in coping mechanisms between males and females within the cultural context. The published literature on gender differences in Lebanon indicate that women are more vulnerable given the wide gender gap [32]. Traditionally, women are responsible for both home and family in addition to their paid work; in contrast to men's roles which are mainly linked to external work [33]. As such, women are negatively impacted by the gender differences in housework, employment, financial hardship and childcare. It is likely that female nurses were overwhelmed with family and work responsibilities during the pandemic, resulting in decreased job satisfaction and eventually, lower resilience. Therefore, organizations should develop gender sensitive resilience enhancing interventions to support men and women in coping successfully with adversities [33]. Future research should examine in further details the gender relations, causes, and manifestations among Lebanese nurses.

Despite the difficult and dangerous working environment at the hospital, three quarters of nurses indicated no intention to quit their current job within the next 12 months. This may be due to resilience having a mitigating effect on nurses' turnover intention, as nurses who have high degree of resilience have less turnover intention. Interventions aiming at enhancing nurses' resilience can therefore be used as a strategy to reduce nurses' turnover intention, in addition to ultimately improving working conditions [34]. Several studies revealed that resilience training interventions using mindfulness and cognitive behavioral therapy (CBT) techniques can strengthen resilience among nurses [35–37]. Likewise, work-based educational interventions were effective in improving nurses' personal resilience. Facilitating resilience workshops could also provide nurses with various resources and strategies that can help them adapt to difficult circumstances [38–39].

In this study, three quarters of nurses reported being exposed to violence in the past 12 months. This is consistent with previous national studies revealing the high level of nurses' exposure to workplace violence [40–41]. Unsurprisingly, nurses who were never exposed to violence had significantly higher resilience levels as compared to those who reported exposure. These findings are consistent with a previous study showing that occupational violence is closely linked to higher rates of burnout and lower resilience [42]. Reducing the incidence of workplace violence and supporting nurses who experience it is therefore essential in order to retain nurses. Nurses' resilience can be enhanced through interventions aiming at providing general education about the impact of violence combined with interventions aiming at improving communication [43]. To be successful, hospital managers must ensure a safe work

environment with the necessary policies and regulations to protect nursing staff [44]. While such interventions are important at all times, they are particularly pivotal at times of public health emergencies and pandemics when physical and emotional fatigue are high, workloads are elevated, working conditions are difficult and administrative support is suboptimal.

## 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. The mental, emotional, and psychological health of nurses should be prioritized in order to decrease psychological distress, improve job satisfaction, and reduce turnover intentions among frontline nurses [1]. Hospital managers should provide adequate organizational support through ensuring adequate access to PPE and accurate and timely information regarding the virus [45]. Nurse managers should also promote self-care among frontline nurses through offering flexible work schedules, adequate breaks, and shorter duty hours; whenever possible. Social support from colleagues, family and friends is necessary to help alleviate the fears associated with the virus [45]. As resilience is associated with higher job satisfaction and lower turnover intention, it is important to improve nurse resilience through empowering nurses, expanding their scope of practice, and enhancing their access to training and support resources and services. Findings of this study outline the need for interventions aimed at improving resilience factors such as emotional strength, adaptability, and belief in one's leadership. This study reveals the need for increasing nurses' psychological competencies such as leadership competencies, communication skills, and decision-making abilities. 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 for being true role models of resilience and for their exemplary sacrifices. The experience of nurses during the pandemic needs to be translated and shared with other institutions in Lebanon and the region as they should be hailed as heroes and role models to follow.

## Limitations

Several limitations were noted in this study. First, the cross-sectional design, allows for the identification of associations, but does not support the establishment of causal relationships. Second, the researchers have done their best to ensure nurses that their participation would not influence their work relationship with the institution, however, we cannot entirely rule out the presence of a social desirability bias. Third, although the experience of nurses 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. Finally, 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. Fifth, the data collection happened at a time when the hospital in general and the frontline nurses in particular, were unusually receiving 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.

## **Conclusion**

Study findings determined the linkages between resilience, job satisfaction, intention to quit, and exposure to violence. The level of resilience of nurses is significantly and positively correlated with job satisfaction and male gender and negatively correlated with intention to quit and exposure to violence. Enhancing the level of resilience of nurses thus have significant positive outcomes on the effectiveness and efficiency of patient service and would improve their retention at a time when they are needed most. Ensuring a safe and violence free practice environment would be essential to reap out the full mitigating effect of resilience. Female nurses require targeted programs to enhance their resilience and wellbeing as they try to balance the multiple, and often competing, work and life responsibilities.

## **Abbreviations**

RHUH: Rafik Hariri Univesrity Hospital

## **Declarations**

## **Ethics approval and consent to participate**

Prior to the initiation of the study, ethical approval was obtained from the Institutional Review Board at the American University of Beirut (SBS-2019-0455). An online consent was obtained from the participants after explaining the aim of the study prior to filling the survey.

## **Consent for publication**

Not applicable

## **Availability of data and materials**

All data generated or analysed during this study are included in this published article.

## **Competing interests**

The authors declare that they have no competing interests.

## **Funding**

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

## Authors' contributions

MA: Developed the conceptual framework and the methodology, lead all aspects of data collection and analysis, interpreted the results and prepared the first draft of the manuscript. KBK: Contributed to the conceptual approach, the questionnaire, data analysis, and the write-up of the manuscript. WG: Helped with the conceptualization of the study, data curation, supervision, validation, and write up of the manuscript. FA: Contributed to the conceptual approach, project administration, supervision, validation, and write up of the manuscript. all authors read and approved the final manuscript.

## Acknowledgements

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

## References

1. Labrague LJ, De los Santos J. Fear of Covid-19, psychological distress, work satisfaction and turnover intention among frontline nurses. *Journal of Nursing Management*. 2020.
2. Zhang W-r, Wang K, Yin L, Zhao W-f, Xue Q, Peng M, et al. Mental health and psychosocial problems of medical health workers during the COVID-19 epidemic in China. *Psychotherapy and psychosomatics*. 2020;89(4):242-50.
3. Nemati M, Ebrahimi B, Nemati F. Assessment of Iranian nurses' knowledge and anxiety toward COVID-19 during the current outbreak in Iran. *Archives of Clinical Infectious Diseases*. 2020;15(COVID-19).
4. Wu Y, Wang J, Luo C, Hu S, Lin X, Anderson AE, et al. A comparison of burnout frequency among oncology physicians and nurses working on the front lines and usual wards during the COVID-19 epidemic in Wuhan, China. *Journal of pain and symptom management*. 2020.
5. Alwani SS, Majeed MM, Hirwani MZ, Rauf S, Saad SM, Shah SH, et al. Evaluation of Knowledge, Practices, Attitude and Anxiety of Pakistans Nurses towards COVID-19 during the Current Outbreak in Pakistan. *medRxiv*. 2020.
6. Luo M, Guo L, Yu M, Wang H. The Psychological and Mental Impact of Coronavirus Disease 2019 (COVID-19) on Medical Staff and General Public–A Systematic Review and Meta-analysis. *Psychiatry Research*. 2020:113190.

7. 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: An International Journal of Medicine*. 2020;113(9):613-7.
8. Ruiz-Fernández MD, Ramos-Pichardo JD, Ibáñez-Masero O, Cabrera-Troya J, Carmona-Rega MI, Ortega-Galán ÁM. Compassion fatigue, burnout, compassion satisfaction and perceived stress in healthcare professionals during the COVID-19 health crisis in Spain. *Journal of clinical nursing*. 2020;29(21-22):4321-30.
9. Hart PL, Brannan JD, De Chesnay M. Resilience in nurses: An integrative review. *Journal of Nursing Management*. 2014;22(6):720-34.
10. 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. *Journal of nursing management*. 2019;27(7):1391-9.
11. Ang S, Uthaman T, Ayre T, Mordiffi S, Ang E, Lopez V. Association between demographics and resilience—a cross-sectional study among nurses in Singapore. *International Nursing Review*. 2018;65(3):459-66.
12. Manomenidis G, Panagopoulou E, Montgomery A. Resilience in nursing: The role of internal and external factors. *Journal of nursing management*. 2019;27(1):172-8.
13. Turner SB, Kaylor SD. Neuman systems model as a conceptual framework for nurse resilience. *Nursing science quarterly*. 2015;28(3):213-7.
14. Öksüz E, Demiralp M, Mersin S, Tüzer H, Aksu M, Sarıkoç G. Resilience in nurses in terms of perceived social support, job satisfaction and certain variables. *Journal of nursing management*. 2019;27(2):423-32.
15. 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. *Frontiers in public health*. 2020;8.
16. Masum AKM, Azad MAK, Hoque KE, Beh L-S, Wanke P, Arslan Ö. Job satisfaction and intention to quit: an empirical analysis of nurses in Turkey. *PeerJ*. 2016;4:e1896.
17. 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. *International journal of mental health nursing*. 2017;26(6):612-9.
18. Yu F, Raphael D, Mackay L, Smith M, King A. Personal and work-related factors associated with nurse resilience: A systematic review. *International journal of nursing studies*. 2019.
19. Guo Yf, Luo Yh, Lam L, Cross W, Plummer V, Zhang Jp. Burnout and its association with resilience in nurses: A cross-sectional study. *Journal of clinical nursing*. 2018;27(1-2):441-9.
20. Connor KM, Davidson JR. Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). *Depression and Anxiety*. 2003;18(2):76-82.
21. Son H, Lee WJ, Kim HS, Lee KS, You M. Hospital workers' psychological resilience after the 2015 Middle East respiratory syndrome outbreak. *Social Behavior and Personality: an international journal*.

- 2019;47(2):1-13.
22. Lin J, Ren Y, Gan H, Chen Y, Huang Y, You X. Factors Influencing Resilience of Medical Workers from Other Provinces to Wuhan Fighting Against 2019 Novel Coronavirus Pneumonia. 2020.
  23. Huang L, Wang Y, Liu J, Ye P, Cheng B, Xu H, 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. *Medical Science Monitor*. 2020;26.
  24. Weathers E. Spirituality and health: A Middle Eastern perspective. *Religions*. 2018;9(2):33.
  25. Pietrantoni L, Prati G. Resilience among first responders. *African health sciences*. 2008;8.
  26. Ammar W, Kdouh O, Hammoud R, Hamadeh R, Harb H, Ammar Z, et al. Health system resilience: Lebanon and the Syrian refugee crisis. *Journal of Global Health*. 2016;6(2).
  27. Turner SB. Resilience of nurses in the face of disaster. *Disaster medicine and public health preparedness*. 2015;9(6):601-4.
  28. Guo YF, Cross W, Plummer V, Lam L, Luo YH, Zhang JP. Exploring resilience in Chinese nurses: A cross-sectional study. *Journal of Nursing Management*. 2017;25(3):223-30.
  29. El-Jardali F, Dimassi H, Dumit N, Jamal D, Mouro G. A national cross-sectional study on nurses' intent to leave and job satisfaction in Lebanon: implications for policy and practice. *BMC nursing*. 2009;8(1):3.
  30. 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 services research*. 2015;15(S1):S3.
  31. Salam A. Predictors of resilience among registered nurses at three private hospitals in South Lebanon. *Theses, Dissertations, and Projects*. 2016.
  32. Avis W. Gender equality and women's empowerment in Lebanon. 2017.
  33. Hirani S, Lasiuk G, Hegadoren K. The intersection of gender and resilience. *Journal of psychiatric and mental health nursing*. 2016.
  34. Yu M, Lee H. Impact of resilience and job involvement on turnover intention of new graduate nurses using structural equation modeling. *Japan Journal of Nursing Science*. 2018;15(4):351-62.
  35. 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.
  36. 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 education today*. 2018;65:201-11.
  37. Wei H, Roberts P, Strickler J, Corbett RW. Nurse leaders' strategies to foster nurse resilience. *Journal of nursing management*. 2019;27(4):681-7.
  38. 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 education today*. 2012;32(4):378-84.

39. McDonald G, Jackson D, Wilkes L, Vickers M. Personal resilience in nurses and midwives: effects of a work-based educational intervention. *Contemporary nurse*. 2013;45(1):134-43.
40. Alameddine M, Kazzi A, El-Jardali F, Dimassi H, Maalouf S. Occupational violence at Lebanese emergency departments: prevalence, characteristics and associated factors. *Journal of Occupational Health*. 2011:1109210208-.
41. 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.
42. Rees C, Wirihana L, Eley R, Ossieran-Moisson R, Hegney D. The effects of occupational violence on the well-being and resilience of nurses. *JONA: The Journal of Nursing Administration*. 2018;48(9):452-8.
43. Van Heugten K. Resilience as an underexplored outcome of workplace bullying. *Qualitative health research*. 2013;23(3):291-301.
44. Wei C-Y, Chiou S-T, Chien L-Y, Huang N. Workplace violence against nurses—prevalence and association with hospital organizational characteristics and health-promotion efforts: cross-sectional study. *International journal of nursing studies*. 2016;56:63-70.
45. Labrague LJ, De los Santos JAA. COVID-19 anxiety among front-line nurses: Predictive role of organisational support, personal resilience and social support. *Journal of Nursing Management*. 2020;28(7):1653-61.