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Burnout, quality of life and perceived patient adverse events among paediatric nurses during the COVID-19 pandemic

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Abstract

Purpose: This cross-sectional, descriptive, correlational study aimed to measure burnout, quality of life (QOL) and perceptions of patient-related adverse events among paediatric nurses amid the COVID-19 pandemic and assess the relationships between these scores and participants' demographic and work-related characteristics.

Background: The mental health of most nurses may severely suffer due to the significant adversities that they struggle with while they care for their patients amid the COVID-19 pandemic. Mental distress negatively affects nurses' relationships and work performance, which may adversely influence the quality of care and patient safety.

Methods: A convenient sample of 225 Jordanian paediatric nurses completed a test batter comprising the Copenhagen Burnout Inventory, the Brief Version of the World Health Organisation's Quality of Life questionnaire and the nurse-perceived patient adverse events' questionnaire. This study was prepared and is reported according to the STROBE checklist.

Results: Paediatric nurses reported high levels of burnout, low QOL and high occurrence of hospital-acquired infections. Participants' age and hospital/unit capacity were significantly associated with burnout and QOL.

Conclusion: Personal traits, perceived salary insufficiency and hospital/unit capacity represent factors that aggravate burnout, lower quality of life and worsen perceived patient safety among paediatric nurses.

Relevance to clinical practice: Policymakers should promote nurses' mental integrity and patient safety by addressing issues of workload and financial sufficiency and by provide interventions aimed to increase nurses' resilience.

Patient or public contribution: Patients or public were not involved in setting the research question, the outcome measures, the design or implementation of the study. However, paediatric nurses responded to the research questionnaires.

KEYWORDS
adverse events, burnout, COVID-19, paediatric nurses, quality of life

1 | INTRODUCTION

1.1 | Burnout

Burnout is described as 'a state of physical, emotional and mental exhaustion that results from long-term involvement in work situations that are emotionally demanding' (Schaufeli & Greenglass, 2001). Nurses' burnout has caught the attention due to its severe consequences on nurses' quality of life (QOL; Fradelos et al., 2014), quality of care and patient safety (Bilal & Sari, 2020; Buckley et al., 2020; Irinyi et al., 2019; Khatatbeh et al., 2020; Nantsupawat et al., 2016). Nurses are a risky community that is prone to burnout because of several reasons such as stressful work environment (Alkhawaldeh et al., 2020), lack of autonomy (AllahBakhshian et al., 2017), exposure to violence (Giménez Lozano et al., 2021) and work overload (Biff et al., 2020). Staffing ratio is also another factor that exacerbate nurses' burnout. For example, one study found that the high levels of burnout among nurses are correlated with poor staffing ratios (Torre et al., 2019). Furthermore, it was found that the poor staffing ratio of more than 1:2 is risky to develop burnout among nurses working at the intensive care units (Bruyneel et al., 2021). In particular, paediatric nursing is a more challenging subfield of nursing because paediatric nurses deal with children who cannot comprehend what is happening to them and who cannot or will not cooperate with health directives. Moreover, the children are sometimes critically ill (Giménez Lozano et al., 2021; Khatatbeh et al., 2022) and paediatric nurses have to care about worried parents at the same time as they care for their children (Giménez Lozano et al., 2021; Van Bogaert et al., 2014).

1.2 | The COVID-19 pandemic

Burnout has long been a threat to the nursing workforce in Jordan and worldwide (Khatatbeh et al., 2022; Mudallal et al., 2017). However, when new COVID-19 disease emerged in China and began to spread to other countries, strict protocols were applied by Jordan's Ministry of Health (MOH). These protocols, together with the ambiguity of the emerging disease, put nurses under additional stress. Because of the COVID-19 pandemic, a new light was shed on nurses' mental health and burnout (Khatatbeh, Alhalaiqa, et al., 2021; Zhang et al., 2021).

1.3 | Patient adverse events

Adverse events refer to events that threaten the safety of patients. It is estimated that around 440,000 people passed away in United States due to preventable adverse events in 2013 (Schwendimann et al., 2018). Moreover, the estimated costs of adverse events in the United States in 2008 was approximately $17 billion (Van den Bos et al., 2011). Adverse events are described as the preventable consequences of incorrect healthcare services (Van den Bos et al., 2011). Adverse events are usually measured by asking nurses about the

> **What does this paper contribute to the wider global clinical community?**
>
> - This survey assessed paediatric nurses exclusively and included nurses working at different paediatric units and wards.
> - This study measured the levels of paediatric nurses' burnout during the COVID-19 pandemic.
> - This study focuses on the importance of promoting paediatric nurses' mental integrity.

perceived frequency, rate or number of adverse events, which is referred to 'nurse-envisioned patient adverse events' (Cho et al., 2016; Van Bogaert et al., 2014). The adverse events are known to be under-reported by nurses for several reasons such as the fear of disciplinary actions (Ullström et al., 2014), blame (Heard et al., 2012) and lack of coworker support (Khatatbeh, Al-Dwaikat, et al., 2021). The most familiar kinds of nurse-envisioned patient adverse events are medication errors, hospital-acquired infections, pressure ulcers and falls.

1.4 | Do demographic and work-related traits make a difference?

Earlier studies have demonstrated significant relationships between nurses' burnout and demographic traits such as age (Azari & Rasouyar, 2016; Naz et al., 2016), level of education (Nowacka et al., 2018) and marital status (Ali & Eissa, 2018). In Jordan, specifically, significant associations were found between nurses' burnout and demographic traits (Mudallal et al., 2017). A positive relationship was found between emotional exhaustion and nurses' age (Mudallal et al., 2017). Moreover, in terms of gender, depersonalisation was higher among female nurses than males, while personal accomplishment was significantly higher among male nurses (Mudallal et al., 2017).

The findings of earlier studies that specifically examined the relationships between demographic traits and burnout in paediatric nurses were contradictory. For example, it was found that younger paediatric nurses experienced higher burnout than their older counterparts (Bilal & Sari, 2020). Conversely, another study found that the burnout grades of paediatric nurses did not differ significantly according to the age or education (Günüşen et al., 2018). Similarly, another study found that paediatric nurses' burnout was not correlated with their gender, age or education (Bilal & Ahmed, 2017).

As with burnout, earlier studies examining the relationships between nurses' demographic traits and their QOL are varied. Some studies found significant associations between nurses' QOL and demographic traits such as age (Naz et al., 2016), gender (Branch & Klinkenberg, 2015) and marital status (Jose & Bhat, 2014). For example, in one study, nurses between 20–30 years old were found to have lower QOL grades than older nurses (Naz et al., 2016), while another

study of paediatric nurses specifically found that lower QOL was reported among nurses over 40 years of age (Günüşen et al., 2018). Similarly, female paediatric nurses reported significantly lower QOL than their male counterparts (Branch & Klinkenberg, 2015). In contrast to these studies, one study found no significant differences in nurses' QOL according to their gender or education level (Fradelos et al., 2014).

Paediatric nurses' QOL has been associated with some work-related traits. For example, one study found that paediatric nurses working longer hours reported higher compassion fatigue, which indicated lower QOL (Yoder, 2010). Higher compassion fatigue was also predominant among paediatric nurses who were taking care of critically ill or dying patients (Merk, 2018). Moreover, working in paediatric units requires high effort, which was found to be associated with increased psychological demands that were negatively related to nurses' QOL (Fogaça et al., 2009). Furthermore, burnout was negatively correlated with nurses' QOL (Erkorkmaz et al., 2018). Finally, the low QOL and high burnout levels among paediatric nurses may negatively impact patient safety (de Lima Garcia et al., 2019; Hall et al., 2016).

1.5 | The theoretical framework

Figure 1 shows a theoretical framework adopted from a previous study (Maunder et al., 2021). According to this framework, demographics (age and gender) and work-related characteristics (working hours, hospital and unit bed capacity.) represent the factors contributing to paediatric nurses' burnout. Burnout, in turn, might affect paediatric nurses' QOL and patient safety.

1.6 | Significance and aims of the study

As a small proportion of the larger nursing community, there is a lack of studies discussing how paediatric nurses are affected by burnout especially during the COVID-19 pandemic (Giménez Lozano et al., 2021). However, previous studies have focused solely on neonatal intensive care units' nurses before the COVID-19 pandemic (Cho et al., 2016; Schwendimann et al., 2018; Van den Bos et al., 2011). Furthermore, the impact of demographic and work-related traits on burnout, QOL and nurse-envisioned patient adverse events, as well as the relationships between them, are not yet well understood among the paediatric nurses' community. Therefore,

further research is needed regarding paediatric nurses' burnout (Buckley et al., 2020) and its correlates. Based on our review of the literature, we believe that this is one of the first studies to explain the impact that demographic and work-related traits have on paediatric nurses' burnout, QOL and perceived patient adverse events during the COVID-19 pandemic. This article will fill up some research gaps regarding the factors associated with paediatric nurses' burnout, QOL and perceived patient adverse events.

This study aimed to (1) measure Jordanian paediatric nurses' grades regarding burnout, QOL and perceived patient adverse events amid the COVID-19 pandemic; (2) assess the relationships between burnout, QOL and nurse-envisioned patient adverse events and (3) assess the relationships between paediatric nurses' demographic and work-related traits and their burnout, QOL and perceived patient adverse events. The demographics and work-related traits studied in this research were age, gender, marital status, number of children, education, tobacco usage, Body Mass Index (BMI), perceived sufficiency of salary, hospital bed capacity, unit bed capacity and number of hours worked per week.

2 | METHODS

2.1 | Design and setting

A cross-sectional, correlational design was used in this study. A total of nine hospitals were selected as research sites. Eight of them were MOH hospitals (including one specialised paediatric hospital), and one was a university-affiliated hospital. More than 90% of the inhabitants in Jordan reside in the northern and central regions (Department of Jordanian Statistics, 2018). Therefore, most of the hospitals were selected from the northern and central regions and one hospital from the southern region. Participants were approached while on duty. The Strengthening the Reporting of Observational studies in Epidemiology (STROBE) checklist (Von Elm et al., 2014) was used in reporting this research (Appendix S1).

2.2 | Participants and data collection

A primary group of 500 paediatric nurses were recorded as possible participants. This initial group reflects the approximate number of
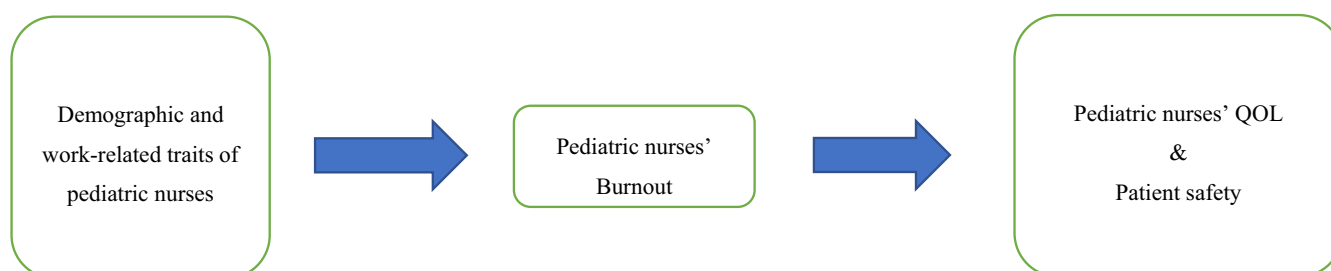

Demographic and work-related traits of pediatric nurses → Pediatric nurses' Burnout → Pediatric nurses' QOL & Patient safety

FIGURE 1 Burnout theoretical framework

paediatric nurses who work at different paediatric wards and units in the target hospitals. Out of this sample, 300 who met inclusion criteria and consented to participate were approached. Inclusion criteria included the following: (1) working for at least 1 year in a clinical paediatric unit or ward such as paediatric intensive care units, neonatal intensive care units, paediatric emergency rooms, paediatric oncology wards and paediatric medical/ surgical wards; (2) having at least an undergraduate nursing certificate; (3) being a part of the regular staff; (4) working at a university or MOH-affiliated hospital and (5) being a Jordanian national.

As English is the formal language of nursing education in Jordan, the original English editions of the instruments were utilised. A cover letter attached to the printed surveys requested participant's consent to participate in the study. Also, the cover letter ensured the optional and undisclosed participation to all participants. Printed surveys were given to prospective participants through their head or charge nurses. Participants were requested to answer the self-administered questionnaires independently and not to discuss responses. Head or charge nurses collected the answered surveys, placed them in a sealed envelope and kept them secure. A pilot study on 20 paediatric nurses who met the inclusion criteria demonstrated very good reliability as reflected by Cronbach's alpha 0.85. The data were collected at the onset of the COVID-19 pandemic between December 2019 and March 2020.

2.3 | Calculating sample size

A priori sample size calculation was done through G*Power software to establish an acceptable statistical power (G*Power, 2020). Using the ANOVA approach, with significance set at 5% and power at 0.90, a total sample size of 207 participants was required. In post hoc analysis, our final 225 subjects provided a power of 0.93, which is statistically acceptable to derive significant conclusions.

2.4 | Measures

The survey consisted of four scales: demographic and work-related traits, the CBI (Kristensen et al., 2005), the Brief Version of the World Health Organisation's Quality of Life questionnaire (WHOQOL-BREF; WHO, 1996) and the nurse-envisioned patient adverse events' questionnaire (Cho et al., 2016; see Table 1, which lists the instruments used, subscales and examples of the instrument questions).

2.4.1 | Demographic and work-related traits

The questionnaire included questions about the respondents' age, gender, marital status, number of children, education, perceived sufficiency of salary, tobacco usage and BMI. Work-related traits included hospital capacity, unit capacity and number of hours worked per week.

2.4.2 | Copenhagen Burnout Inventory (CBI)

The CBI is a validated questionnaire that was established as a part of the Danish research on burnout, motivation and job Satisfaction (Borritz et al., 2006; Kristensen et al., 2005). The CBI is made of 19 Likert-type questions that quantify three scopes of burnout: individual burnout (six questions), professional burnout (seven questions) and customer-related burnout (six questions) (Kristensen et al., 2005). The total grade for each of these three dimensions is the average grade of its questions (Kristensen et al., 2005). The higher the grade, the higher the burnout levels.

The responses and scoring of the individual burnout subscale are as follows: Always (100), Often (75), Sometimes (50), Seldom (25) and Never/Almost Never (0) (Kristensen et al., 2005). Similarly, the responses and scoring for the professional burnout subscale are as follows: To a very high degree (100), To a high degree (75), Somewhat (50), To a low degree (25) and To a very low degree (0) (Kristensen et al., 2005). Finally, the responses and scoring for the first four questions of customer-related burnout are as follows: To a very high degree (100), To a high degree (75), Somewhat (50), To a low degree (25) and To a very low degree (0). The last two questions have different responses but similar scoring: Always (100), Often (75), Sometimes (50), Seldom (25) and Never/almost never (0) (Kristensen et al., 2005). Cronbach's alphas for the CBI subscales were high, ranging from 0.85–0.87 (Kristensen et al., 2005). In this study, Cronbach's alphas were 0.90 for individual burnout, 0.83 for professional burnout and 0.88 for customer-related burnout.

2.4.3 | WHOQOL-BREF

The participants' QOL was measured utilising the summarised edition of the WHOQOL-100, the WHOQOL-BREF. It is made of 26 Likert-type questions; two questions appraise overall QOL and 24 questions appraise the following four spheres: bodily well-being, mental well-being, socialisation and climate (Skevington et al., 2004). Each sphere evaluates different facets of QOL (WHO, 1996). According to the BREF manual, each sphere is made of a number of questions that require a 5-point Likert-type response, such as 'how much', 'how satisfied' or 'how good' the respondent felt during the past 2 weeks. Each answer gets a potential grade of one to five; the higher the grade, the better the QOL, except for the three negatively expressed scales (3, 4 and 26) for which the grades should be reversed (WHO, 1996). The WHOQOL-BREF spheres showed acceptable reliabilities; Cronbach's alpha for the bodily well-being sphere was 0.82; for mental well-being sphere, it was 0.81; for the socialisation sphere, it was 0.68 and, for the climate sphere, it was 0.80 (Skevington

TABLE 1 The instruments used

Instrument	Subscale	No. of questions	Examples of the questions
The CBI 19 Likert-type questions	Individual burnout	6	How often do you feel worn out?
	Professional burnout	7	Do you feel that every working hour is tiring for you?
	Customer-related burnout	6	Are you tired of working with clients?
The WHOQOL-BREF 26 Likert-type questions[a]	Bodily well-being	7	To what extent do you feel that physical pain prevents you from doing what you need to do?
	Mental well-being	6	To what extent do you feel your life to be meaningful?
	Socialization	3	How satisfied are you with your personal relationships?
	Climate	8	How safe do you feel in your daily life?
Nurse-envisioned patient adverse events 4 Likert-type questions	Medication errors	1	How often patients receive wrong medication or dose during last month?
	Patient falls	1	How often patients experience falls after admission during last month?
	Hospital-acquired infections	1	How often patients experience hospital-acquired infection during last month?
	Pressure ulcers	1	How often patients experience pressure ulcer during last month?

[a]Two questions assess general quality of life and 24 questions assess four spheres: bodily well-being, mental well-being, socialization, and climate.

et al., 2004). In this study, Cronbach's alphas for the four spheres were satisfactory; they were 0.70 for the bodily well-being sphere, 0.70 for the mental well-being sphere, 0.78 for the socialisation sphere and 0.85 for the climate sphere.

2.4.4 | Nurse-envisioned patient adverse events

The nurse-envisioned patient adverse events' questionnaire has been used by many researchers and found to be valid (Cho et al., 2016; Van Bogaert et al., 2014). It uses a six-point Likert scale (never, once a month, a few times a month, once a week, a few times a week and every day) to inquire as follows about the frequency of adverse events during the past month: medication errors, patient falls, hospital-acquired infections and pressure ulcers. The results of the nurse-envisioned patient adverse events' questionnaire showed good internal consistency reliability; Cronbach's alpha was 0.83 for the overall scale. Inter-item correlations were checked and found to be moderate to strong, suggesting very good construct validity. All four questions were loaded into one factor with good communalities supporting the validity

of the overall scale. This study used the average grade of the four questions to measure nurse-envisioned patient adverse events. The higher the grade, the higher the adverse events.

2.5 | Ethical considerations

Before data collection, the necessary ethics approvals were obtained from the institutional review boards at the ministry of health (reg. # 21114) and the university-affiliated hospital (reg. # 13-3-17). Also, the study was conducted conforming to the ethical standards of the Declaration of Helsinki (World Medical Association, 2013).

2.6 | Data analysis

The data were analysed using SPSS software, version 20.0. The statistical significance level was set as $p < 0.05$. Kolmogorov–Smirnov tests for the outcome variables were checked and found to be significant meaning that the data were non-normally distributed. However, kurtosis, skewness values and histograms indicated the normality of the

distribution of the outcome variables. To describe the participants' demographic and work-related traits, frequencies and percentages were used. Furthermore, median and interquartile range (IQR) were used to describe the outcome measures (burnout, quality of life and nurse-envisioned patient adverse events). Multiple regression analyses were used to examine burnout, QOL and nurse-envisioned patient adverse events grades according to demographic and work-related traits.

3 | RESULTS

3.1 | Descriptive analysis of the demographic and work-related traits of the participants

The participation of 225 out of 300 paediatric nurses in this study yielded a 75% response rate. Participants' demographic and work-related traits are shown in Table 2.

3.2 | Descriptive analysis of burnout, QOL and nurse-envisioned patient adverse events outcome grades

The median score and interquartile range for the overall burnout was 50.2 (40.6–60.7). The highest median score and interquartile range among the CBI subscales was for individual burnout 75.0 (58.3–91.7), followed by professional burnout 64.3 (53.6–82.1), and then customer-related burnout 62.5 (45.8–79.2). The median score and interquartile range for overall QOL was 47.0 (34.5–53.3). The four spheres of the WHOQOL-BREF showed equal median scores and close interquartile ranges. The hospital-acquired infections were rated higher than other types of nurse-envisioned patient adverse events as reflected by the median score and interquartile range 2.0 (1.0–3.0) (see Table 3, which shows Participants' grades in the outcome variables).

3.3 | Correlations between participants' burnout, QOL, perceived patient adverse events and demographic and work-related traits

The results showed that there were small-to-moderate but, nevertheless, significant correlations between nurses' age and their individual burnout ($r = −0.19$, $p < 0.010$) and total burnout ($r = −0.14$, $p < 0.050$) grades. In addition, unit capacity correlated significantly with the socialisation sphere ($r = −0.15$, $p < 0.050$) and total burnout grades ($r = 0.13$, $p < 0.050$). The results also showed that the overall QOL rating had a significant negative correlation with the total burnout grade. None of the demographic or work-related traits significantly correlated with the nurse-envisioned patient adverse events grades. However, there was a significant negative correlation between the overall QOL rating and the total nurse-envisioned patient adverse events grades (see Table 4, which demonstrates the correlations among study variables).

TABLE 2 Participants' demographic and work-related traits (N = 225)[a]

Trait	N	%
Gender		
Male	11	4.9
Female	212	95.1
Marital status		
Single/unmarried	39	17.3
Married	186	82.7
Level of education		
Diploma	5	2.2
Bachelor	197	87.6
Master	23	10.2
Type of hospital		
University-affiliated	67	29.8
MOH	158	70.2
Unit/ward		
General pediatric ward	87	39.2
Critical care unit	135	60.8
Smoking status		
Non-smoker	201	89.3
Smoker	24	10.7
Salary perception		
Sufficient	62	27.8
Insufficient	161	72.2
Age		
<31 years	83	37.7
31–40 years	101	45.9
>40 years	36	16.4
Number of children		
No children	52	23.3
1–2 children	75	33.6
3–4 children	72	32.3
More than 4 children	24	10.8
BMI		
<18.5 (Underweight)	6	2.9
18.5–24.9 (Normal)	93	45.1
25–29.9 (Overweight)	78	37.9
≥30 (Obese)	29	14.1
Hospital capacity		
≤100 beds	9	4.0
101–300 beds	110	48.9
301–600 beds	89	39.6
>600 beds	17	7.6
Unit capacity		
≤10 beds	53	24.1
11–30 beds	106	48.2
31–60 beds	47	21.4
>60 beds	14	6.4
Weekly working hours		
≤35 h	28	12.6
36–40 h	91	41.0
41–45 h	61	27.5
>45 h	42	18.9

Note: %: percentage.

Abbreviation: N, number.

[a]Number of participants varied across variables.

3.4 | Regression analysis

Multiple regression analyses were run to find the factors associated with participants' overall QOL, burnout and nurse-envisioned patient adverse events. The covariates in the three models were a group of demographic and work-related traits. Taken all together, these traits significantly affected overall QOL (F (13, 180) = 2.97, p = 0.001, R^2 Adjusted = 0.12), burnout (F (13, 180) = 3.0, $p < 0.0001$, R^2 Adjusted = 0.12) and nurse-envisioned patient adverse events (F (13, 180) = 1.81, p = 0.040, R^2 Adjusted = 0.05). For the model valuating overall QOL, the significant covariates were unit capacity (β = −0.28, $p < 0.010$) and perceived sufficiency of salary (β = −0.28, $p < 0.001$). For the burnout model, the significant covariates were age (β = −0.25, $p < 0.010$), hospital capacity (β = −0.32, $p < 0.010$), unit capacity (β = 0.30, $p < 0.010$) and perceived sufficiency of salary (β = 0.19, $p < 0.010$). Furthermore, the only significant covariate of nurse-envisioned patient adverse events grades was the perceived sufficiency of salary (β = 0.19, $p < 0.050$) (see Table 5, which shows regression results for overall QOL, burnout and nurse-envisioned patient adverse events).

4 | DISCUSSION

4.1 | Burnout, QOL and nurse-envisioned patient adverse events grades

This study aimed to determine the relationships between demographic and work-related traits and burnout, QOL and perceived patient adverse events among Jordanian paediatric nurses amid the COVID-19 pandemic. Additionally, this study aimed to measure Jordanian paediatric nurses' burnout, QOL and perceived patient

adverse events grades and the associations between the studied variables. High levels of burnout were found among the Jordanian paediatric nurses who get involved in this study, as revealed by grades of the three CBI subscales of 73.77, 66.05 and 62.5. Our study grades are much higher than the grades mentioned in the PUMA study-based validation (Kristensen et al., 2005). According to this PUMA study-based validation, it was indicated that nurses' grades on the three CBI subscales are 36.9, 35.0 and 29.7 (Kristensen et al., 2005). We compared our study's grades to this study (Kristensen et al., 2005) because it introduces reference burnout grades for different professionals, including nurses. The higher burnout grades among paediatric nurses in our study might be due to the difference in nursing units, as most of the participants (60.8%) work in ICU. However, our finding of high burnout grades is also consistent with the results of a previous study in Jordan (Mudallal et al., 2017). Our study results need to be compared with this study (Mudallal et al., 2017) as it studied Jordanian nurses with similar demographic and work-related traits, especially those working at paediatric wards/units.

In terms of QOL, paediatric nurses in Jordan scored relatively low, as shown by the WHOQOL-BREF grades. The low grades in the WHOQOL-BREF spheres might be secondary to the high burnout among paediatric nurses who get involved in this study. The paediatric nurses' lowest grades, which were in the bodily well-being and climate spheres, could be related to the high workload, as reflected in the relatively high unit capacity (mean = 28.4).

As perceived by paediatric nurses, hospital-acquired infections were the most frequent among four types of perceived patient adverse events. This could be related to paediatric nurses' fear of the COVID-19 disease spread (Khatatbeh, Al-Maqableh, et al., 2021), and the low immunity of paediatric patients. These findings can

TABLE 3 Participants' grades in the outcome variables ($N = 225$)

Measure	Minimum	Maximum	Median	IQR
Overall burnout	12.8	74.1	50.2	40.6–60.7
Individual burnout	16.67	100.0	75.0	58.3–91.7
Professional burnout	17.86	100.0	64.3	53.6–82.1
Customer-related burnout	0	100.0	62.5	45.8–79.2
Overall QOL	12.5	83.0	47.0	34.5–53.3
Bodily well-being	6.0	81.0	44.0	38.0–50.0
Mental well-being	6.0	88.0	44.0	38.0–56.0
Socialization	0	94.0	44.0	25.0–56.0
Climate	0	82.0	44.0	31.0–56.0
Nurse-envisioned patient adverse events				
Medication errors	1	6	1.0	1.0–2.0
Pressure ulcer	1	6	1.0	1.0–2.0
Falls	1	5	1.0	1.0–2.0
Hospital-acquired infections	1	6	2.0	1.0–3.0

Abbreviation: IQR, interquartile range.

TABLE 4 Correlations among study variables (N = 225)

	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Age	0.62**	0.27**	−0.27**	−0.06	0.09	0.02	−0.19**	−0.09	−0.07	−0.02	0.01	0.04	−0.01	−0.14*	−0.11
(2) No. of children	1	0.17*	−0.28**	−0.09	0.03	0.02	−0.07	−0.02	0.01	−0.07	−0.03	0.01	−0.07	−0.03	−0.10
(3) BMI		1	−0.06	0.02	0.04	−0.03	0.07	0.09	0.09	−0.10	−0.06	−0.01	0.04	0.10	0.10
(4) Hospital capacity			1	0.69**	0.13	−0.05	0.09	−0.04	−0.10	0.10	0.12	0.02	0.20**	−0.02	0.12
(5) Unit capacity				1	0.17*	−0.22**	0.22**	0.07	0.04	−0.02	−0.11	−0.15*	−0.04	0.13*	0.08
(6) Weekly working hours					1	−0.05	−0.04	−0.02	−0.04	0.10	0.07	0.03	0.09	−0.04	0.04
(7) Overall QOL						1	−0.44**	−0.36**	−0.50**	0.33**	0.50**	0.40**	0.49**	−0.50**	−0.14*
(8) Individual burnout							1	0.62**	0.54**	−0.50**	−0.49**	−0.37**	−0.40**	0.83**	−0.01
(9) Professional burnout								1	0.67**	−0.57**	−0.46**	−0.26**	−0.49**	0.89**	−0.06
(10) Customer-related burnout									1	−0.48**	−0.55**	−0.30**	−0.50**	0.86**	−0.04
(11) Bodily well-being										1	0.59**	0.47**	0.60**	−0.60**	0.07
(12) Mental well-being											1	0.60**	0.75**	−0.58**	−0.09
(13) Socialization												1	0.68**	−0.36**	−0.09
(14) Climate													1	−0.54**	−0.01
(15) Overall burnout														1	−0.05
(16) Nurse-envisioned patient adverse events															1

*$p < 0.05$; **$p < 0.01$.

TABLE 5 Regression results for overall QOL, burnout, and nurse-envisioned patient adverse event (N = 225)

Model summary	Overall QOL		Overall burnout		Nurse-envisioned patient adverse events	
	$F_{(13, 180)} = 2.97$, $p = 0.001$, R^2 Adjusted = 0.12		$F_{(13, 180)} = 3.0$, $p < 0.0001$, R^2 Adjusted = 0.12		$F_{(13, 180)} = 1.81$, $p = 0.04$, R^2 Adjusted = 0.05	
Covariates	β	t	β	t	β	t
Constant		3.50***		1.24		2.57*
Age	0.048	0.50	−0.25	−2.66**	−0.17	−1.75
Sex	−0.13	−1.94	0.10	1.56	−0.01	−0.16
Marital status	0.01	0.17	−0.05	−0.68	−0.07	−0.80
Number of children	0.05	0.49	0.05	0.55	0.02	0.26
Body mass index	−0.02	−0.30	0.12	1.67	0.14	1.92
Level of education	−0.02	−0.31	0.09	1.34	−0.17	−2.26
Smoking	−0.11	−1.57	0.12	1.73	−0.08	−1.22
Type of hospital	0.01	0.04	−0.07	−0.82	−0.03	−0.37
Unit/ward	0.01	0.15	−0.06	−0.79	0.02	0.26
Hospital capacity	0.21	1.96	−0.32	−3.01**	0.12	1.14
Unit capacity	−0.28	−2.74**	0.30	2.99**	−0.09	−0.91
Monthly salary perception	−0.28	−3.84***	0.19	2.62**	0.19	2.53*
Working hours per week	0.02	0.35	−0.05	−0.79	−0.02	−0.34

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

explain our findings, as it studied middle eastern healthcare workers and hospitals, In the case of our study, most of the respondents work with critically ill paediatric patients in the ICU.

4.2 | Correlations between participants' burnout, QOL, perceived patient adverse events and demographic and work-related traits characteristics

The study aimed to assess the relationships between demographic and work-related traits and burnout, QOL and perceived patient adverse events among Jordanian paediatric nurses during the COVID-19 pandemic.

Nurses' age negatively correlated with their burnout grades; however, unit capacity positively correlated with their burnout grades. These results were compatible with a previous study examining the relationships between demographic and work environment traits and nurses' burnout (Wang et al., 2020). They found that older nurses (above 36 years old) reported higher satisfaction with their jobs than their younger colleagues and those working with a larger number of patients reported high burnout grades (Wang et al., 2020). Higher unit capacity is associated with higher workloads. This could explain the increased burnout grades among paediatric nurses. Older nurses who are more experienced reported lower burnout due to several reasons that may include, but are not limited

to, flexible work schedules, higher monthly salary, seniority at work and better use of coping strategies.

This study also showed that the overall QOL grades negatively correlated with both burnout and nurse-envisioned patient adverse events amid the COVID-19 pandemic. In other words, higher burnout was negatively associated with lower QOL, and a low QOL was associated with more adverse events. These results were consistent with the literature. For instance, one study found that burnout grades among health care workers were associated with patient safety (de Lima Garcia et al., 2019). In addition, another study examined paediatric nurses' QOL and found that lower QOL was associated with poorer quality of patient care (Berger et al., 2015). These study results warrant further exploration of the mediational role that QOL could play in the relationship between burnout and patient adverse events.

Multiple regression results revealed that the perceived sufficiency of salary was a significant covariate of burnout, QOL and nurse-envisioned patient adverse events. The results showed that paediatric nurses who had a lower perception of their salaries tend to have higher burnout and lower QOL grades and report more adverse events related to their patients. It is recommended to improve work environments and increase wages to alleviate stress and related burnout associated with nursing jobs (Holdren et al., 2015; McHugh & Ma, 2014; Özlü et al., 2017; Zou et al., 2016). Based on the results of this study, Jordanian healthcare decision-makers and stakeholders should ensure that paediatric nurses' wages match

their workloads. The results also showed higher burnout among paediatric nurses working at units or hospitals with higher bed capacities. This finding might be partially consistent with a previous study which demonstrated higher burnout levels among nurses with poor staffing ratios (Torre et al., 2019). This interpretation depends on our assumption that units or hospitals with high bed capacity might affect the nurses' staffing ratio.

On the contrary, the results showed no significant correlation between burnout, QOL and nurse-envisioned nurse-perceived patient adverse events with some paediatric nurses' demographic and personal traits. For example, there was no significant correlation between the outcome sores and paediatric nurses' gender. This finding mismatches previous studies which found a higher burnout (Mudallal et al., 2017) and a lower QOL (Branch & Klinkenberg, 2015) among female nurses than male nurses. However, our result was congruent with two previous studies which found no significant differences in burnout (Bilal & Ahmed, 2017) or QOL (Fradelos et al., 2014) rates between female and male nurses. Our finding might be related to the nature of the Arab community in which female nurses could have fewer night shifts or fewer physical assignments. In terms of educational level, our findings match what a previous study found that there is no correlation between burnout (Bilal & Ahmed, 2017) or QOL (Fradelos et al., 2014) and nurses' educational level. This result might be explained by the relatively high percentage of nurses holding a master's degree who have the same assignments and work conditions as nurses with a bachelor's degree. In other words, nurses with a higher educational level do not get different privileges from those with a bachelor's degree.

5 | LIMITATIONS

The authors understand that the latest sample was more convenient rather than randomly nominated, which may have had an impact on statistical conclusions and the generalisation of the findings. However, because our sample consisted of paediatric nurses working at different units including paediatric oncology units/wards, our results might be generalizable to oncology hospitals' nurses who are assigned at paediatric units/wards. Measuring patient adverse events from the perspective of paediatric nurses might also be another issue. Thus, we recommend evaluating patient safety issues objectively by reviewing patients' charts and hospital incident reports. Furthermore, examining general QOL could be another limitation. Thus, we recommend evaluating professional QOL to capture the aspects of nurses' QOL that are directly attributable to their work. Although we assumed that the COVID-19 pandemic could be a contributing factor to the high burnout and low QOL, none of the variables collected examined the impact of COVID-19. At the same time, we think that the COVID-19 pandemic has exacerbated the burnout levels among our study participants. Last, our sample homogeneity is not guaranteed because it was selected from two types of hospitals and different paediatric units and wards.

6 | CONCLUSIONS

This study revealed that paediatric nurses in Jordan have high burnout grades and low QOL, especially in the climate and bodily well-being
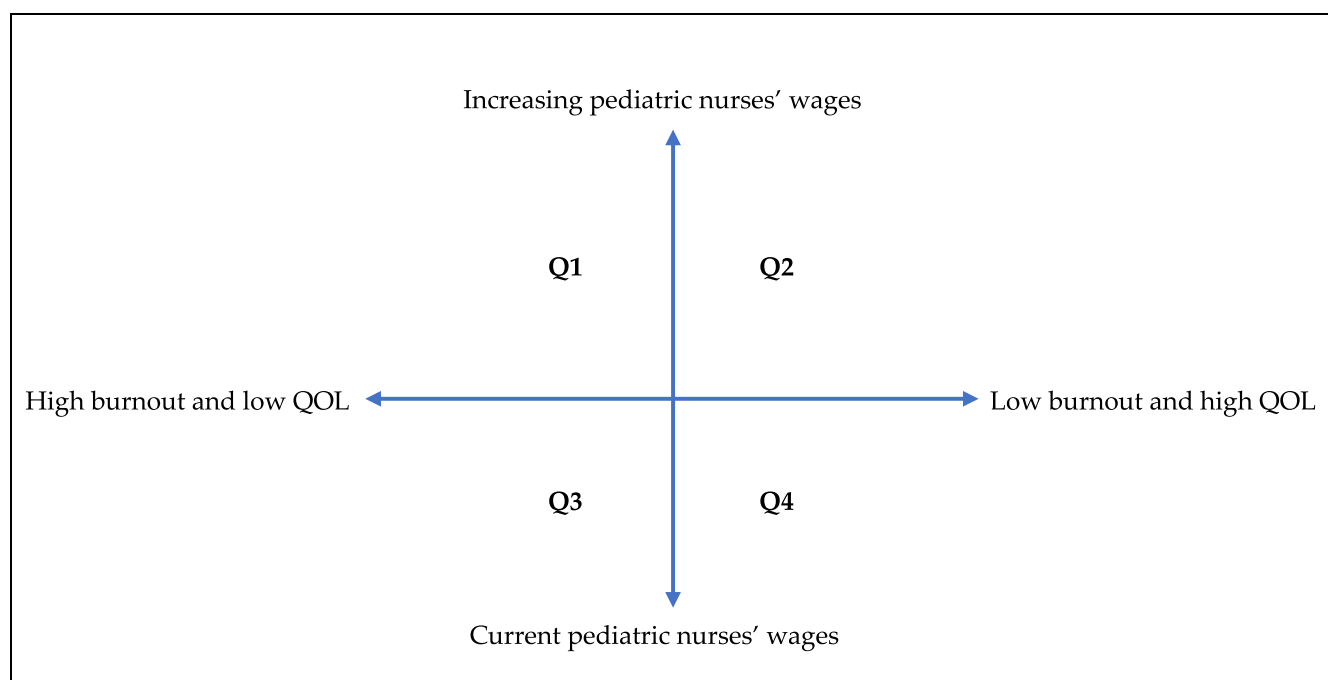

FIGURE 2 The probable scenarios that could take place because of increasing pediatric nurses' wages

spheres. This study also demonstrated some differences in paediatric nurses' burnout and QOL based on demographic and work-related traits. Factors that impact burnout among paediatric nurses are age, hospital capacity, unit capacity and perceived sufficiency of salary. Factors associated with paediatric nurses' QOL are unit capacity and perceived sufficiency of salary. The only covariate of perceived patient adverse events among paediatric nurses is perceived sufficiency of salary. Personal traits, perceived salary insufficiency and hospital/unit capacity represent factors that aggravate burnout, lower quality of life and worsen perceived patient safety among nurses.

7 | RELEVANCE TO CLINICAL PRACTICE

Policymakers should promote nurses' mental integrity and patient safety by addressing issues of workload and financial sufficiency, and by provide interventions aimed to increase nurses' resilience. The interventions needed include providing more co-worker support, especially for older paediatric nurses, increasing managerial support, reducing nurse–patient ratio and increasing monthly salaries.

7.1 | A scenario analysis—increasing paediatric nurses' wages

In this section, we will introduce the possible scenarios that could happen in the future as a result of increasing paediatric nurses' wages. Earlier studies have recommended increasing nurses' salaries to alleviate related burnout (Holdren et al., 2015; McHugh & Ma, 2014; Özlü et al., 2017; Zou et al., 2016). So, there will be two uncertainties; salary increment and burnout and QOL levels. Figure 2 shows the probable scenarios that could take place because of increasing paediatric nurses' salaries. Based on the pre-existent literature (Holdren et al., 2015; McHugh & Ma, 2014; Özlü et al., 2017; Zou et al., 2016), majority of paediatric nurses with high burnout and low QOL will move from the third quarter to the second quarter as a result of increasing their wages. However, some paediatric nurses, in the first quarter might continue complaining of high burnout and low QOL even with increasing their wages. The reason behind these cases might be the complicated causes and contributing factors of their high burnout. The last group of paediatric nurses, which falls in the fourth quarter, reflects some paediatric nurses who have low burnout and high QOL even with their low wages. The reason behind this might be the good environment they perceive, such as their manager support (Khatatbeh et al., 2020).

AUTHOR CONTRIBUTIONS
All authors are responsible for the reported research and have approved the manuscript as submitted. Haitham Khatatbeh and Tariq Al-Dwaikat involved in conceptualisation, data collection, data curation, writing—original draft preparation and reviewing and editing. Huda Alfatafta and Amira Mohammed Ali involved in conceptualisation and writing—reviewing and editing. Annamária Pakai performed in conceptualisation, writing—reviewing and editing and supervision.

CONFLICT OF INTEREST
The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT
The data set used in this research is available from the corresponding author upon a reasonable request.

ETHICAL APPROVAL
The study was conducted in accordance with the Declaration of Helsinki. It was also approved by the Scientific Research Committee at the JORDANIAN MINISTRY OF HEALTH (reg. # 21114) and from the Ethics Committee at KING ABDULLAH UNIVERSITY HOSPITAL (reg. # 13-3-17).

CONSENT TO PARTICIPATE
Each participant was asked to sign the consent form on the cover sheet.

CONSENT FOR PUBLICATION
We, Haitham Khatatbeh and the co-authors, give our consent for the publication of this manuscript.

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SUPPORTING INFORMATION

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

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