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**THE RELATIONSHIPS BETWEEN PEDIATRIC NURSES' BURNOUT, QUALITY
OF LIFE, AND THEIR PERCEIVED PATIENT ADVERSE EVENTS**

Ph.D. Dissertation

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Dedication

I dedicate this work to the spirit of my father. To my mother, grandfather, and grandmother who raised me up and supported me throughout my life. To my wife who supported me in every way. To my beloved children Lamar, Mohammad, Sidra, and Yousuf. To my brother who incredibly supported me.

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Abbreviations

BO: Burnout

CBI: Copenhagen Burnout Inventory

CF: Compassion Fatigue

CFA: Confirmatory Factor Analysis

CFI: Comparative Fit Index

CS: Compassion Satisfaction

ITL: Intent to Leave

MBI: Maslach Burnout Inventory

MOH: Ministry of Health

NPPAEs: Nurse-Perceived Patient Adverse Events

OLBI: Oldenburg Burnout Inventory

PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyzes

QOL: Quality of Life

SEM: Structural Equation Modelling

WHO: World Health Organization

WHOQOL-BREF: World Health Organization Quality of Life-Bref Questionnaire

WR-QOLS: Work-Related Quality of Life Scale

1. Introduction

The primary purpose of this dissertation was to examine the relationships between burnout (BO), quality of life (QOL), and the nurse-perceived patient adverse events (NPPAEs) among pediatric nurses in Jordan. This dissertation encompasses an introduction chapter, a systematic review, and a cross-sectional study composed of four sub-studies. The systematic review is titled “Nurses’ burnout and quality of life: A systematic review and critical analysis of measures used” and published in *Nursing Open*. The cross-sectional study is composed of four sub-studies that were done based on the same dataset and integrated into one study in this dissertation. The first sub-study discusses the relationships of demographic and work-related characteristics with pediatric nurses’ BO, QOL, and NPPAEs; the abstract is published in the journal of *Value in Health* under the title “PNS257 The Relationships of Sociodemographic and Work-Related Characteristics of Pediatric Nurses with Their Burnout, Quality of Life, and Perceived Patient Safety”. The second sub-study assesses the extent to which the integrated Compassion Satisfaction - Compassion Fatigue - Empowerment model can explain the relationships between pediatric nurses’ BO, QOL, perceived patient safety, and work-related variables. It is published in the *Journal of clinical nursing* under the title “Paediatric nurses' burnout, quality of life and perceived patient adverse events during the COVID-19 pandemic: Testing an integrated model using structural equation modelling”. The fourth sub-study assesses the moderating role of hospital type in the relationship between pediatric nurses' QOL and intent to leave (ITL). It is published in *Nursing Open* under the title “The relationship between paediatric nurses' quality of life and intent to leave: The moderating role of hospital type”. The last sub-study explores the moderating effect of the common work-shift on the relationship between pediatric nurses' BO and their health perception. It is accepted to be published in *Nursing Open* under the title “Pediatric nurses’ burnout and perceived health: The moderating effect of the common work-shift”.

It is well known that the nurses are among those staff dealing and working with many people, including clients, families, and co-workers, which make them more vulnerable to BO (Chou et al., 2014; Gómez-Urquiza et al., 2017; Manzano-García & Ayala, 2017; Messias et al., 2019). Other reasons that make nurses particularly susceptible to BO might include the extra time needed in following up patients, poor work environment, high workload, low salaries, and poor coping skills to deal with stressors.

For several reasons, we argue that pediatric nurses are even more vulnerable to BO. For example, pediatric nurses deal with children who are afraid of the hospital environment (Khatatbeh, Pakai, et al., 2021). Also, some of those patients are critically ill which makes pediatric nursing more complicated (Khatatbeh, Pakai, et al., 2021). Furthermore, pediatric nurses need to be caring about the parents who are worried about their children.

BO is attracting a considerable attention due to its serious consequences, whether on staff productivity, client satisfaction, or institutions' reputation (Manzano-García & Ayala, 2017; Maslach, Jackson, Leiter, Schaufeli, & Schwab, 1986). BO also has several physical effects such as musculoskeletal diseases, mental effects such as depression, and job-related effects such as absenteeism (Salvagioni et al., 2017). Additionally, BO might affect nurses' QOL (Aytekin et al., 2013; Azari & Rasouyar, 2016; Fradelos et al., 2014; Hatamipour et al., 2017; Naz et al., 2016) and increase their absenteeism (Aytekin et al., 2013; Wu et al., 2011). Ultimately, nurses' absenteeism and low QOL might affect the patient safety and quality of nursing care provided to patients (Bilal & Sari, 2020; Buckley et al., 2020; Irinyi et al., 2019; Kelleci et al., 2011; H. Khatatbeh, Pakai, Pusztai, et al., 2020; Nantsupawat et al., 2016). Also, nurses' BO was associated with more patient adverse events such as medication errors and nosocomial infections (Vogus et al., 2020).

1.1. The emerging COVID-19 pandemic

BO has long been a threat to the nursing workforce in Jordan and worldwide (H. Khatatbeh, Pakai, et al., 2021; 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) even before the first case of COVID-19 in the country was diagnosed on March 2, 2020 (M. Khatatbeh, 2021). These protocols, together with the ambiguity of the emerging disease, put nurses under additional stress. Because of the COVID-19 pandemic, new light was shed on nurses' mental health and BO (Duarte et al., 2020; M.

Khatatbeh, Alhalaiqa, et al., 2021; M. Khatatbeh, Khasawneh, et al., 2021; Li et al., 2021; Zhang et al., 2021).

1.2. Factors associated with BO and poor QOL

Previous studies have demonstrated significant relationships between nurses' BO and demographic characteristics such as age (Abdo et al., 2016; Azari & Rasouyar, 2016; Naz et al., 2016), level of education (Nowacka et al., 2018), and marital status (Ali & Eissa, 2018). In Jordan, specifically, significant correlations were found between nurses' BO and demographic characteristics (Mudallal et al., 2017). For example, a positive relationship was found between emotional exhaustion and nurses' age (Mudallal et al., 2017). In terms of gender, depersonalization was higher among female nurses than males, while personal accomplishment was significantly higher among male nurses (Mudallal et al., 2017).

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

Several studies have discussed the association between nurses' BO and their health. For example, a study found that nurses' stress and health status are negatively correlated (S. H. Lin et al., 2014). Similarly, another study found that pediatric nurses with higher stress reported poorer health than other nurses (H. Khatatbeh, Al-Dwaikat, et al., 2021).

Additionally, literature is rich with studies discussing the relationship between shift work and nurses' health. For instance, a Hungarian study found that varying shifts are stressful for nurses and associated with poor quality sleep (Fusz et al., 2021). Also, a study demonstrated that nurse's long-term illness is associated with a higher night-to-day shift ratio (Dall'Ora et al., 2020). Likewise, an Italian study found that nurses working on night shifts are more prone to sleep difficulties, tiredness, and cardiac symptoms than nurses working on day shifts (Ferri et al., 2016). Also, another study found that sleep quality for nurses working on shifts is poorer than nurses not working on shifts (McDowall et al., 2017). A Danish study examined the impact of shift work on the lives of intensive care unit nurses (Jensen et al., 2018). The results showed

that sleep difficulties were more common among nurses working on evening shifts than other nurses (Jensen et al., 2018). Also, nausea and headache were more common among nurses working on night than those working on evening shifts (Jensen et al., 2018). Furthermore, mood swings were more common among critical care nurses working on night shift than those working on evening shifts (Jensen et al., 2018).

The relationship between nurses' work-shift and BO was discussed extensively in the previous studies. For example, nurses working on night shifts were found to have more mental symptoms than those working on day shifts (Ferri et al., 2016). Additionally, another study found that nurses working on day shift are having lower depression than nurses working on rotating shifts (Dehring et al., 2018). Also, a literature review concluded that job satisfaction is diminished with working permanently on night shifts (Dall'Ora et al., 2016). However, an integrative review concluded that more research is needed to study the influence of shift work on nurses' psychological well-being (Tahghighi et al., 2017). We argue that pediatric nurses' BO and their perceived health are correlated. Based on previous studies (Haun & Baethge, 2020; Hulsegge et al., 2020; H. Khatatbeh, Pakai, et al., 2021; Nabe-Nielsen et al., 2011), we claim that the common work-shift moderates the relationship between nurses' BO and their perceived health (See *Figure 1*).

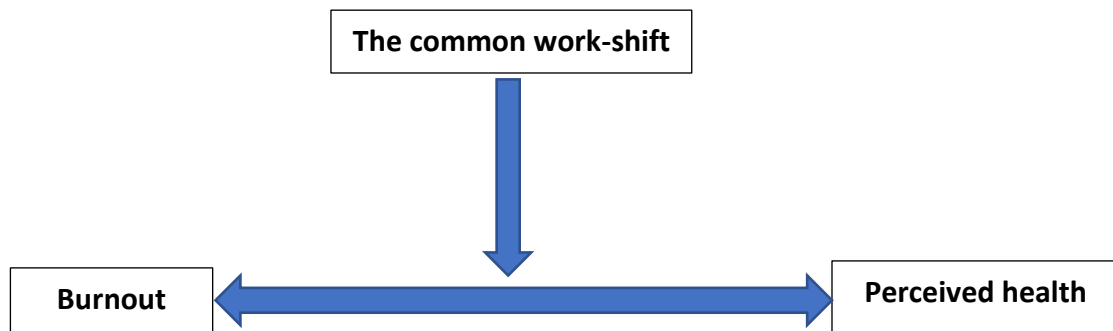


Figure 1. The conceptual model of the relationship between BO and perceived health

Similarly, previous studies examining the relationships between nurses' demographic characteristics and their QOL are varied. Some studies found significant associations between nurses' QOL and demographic characteristics 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 and 30 years old were found to have lower QOL scores than older nurses

(Naz et al., 2016), while another study of pediatric nurses specifically found that lower QOL was reported among nurses over 40 years of age (Günüşen et al., 2018). Similarly, female pediatric 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 based on their gender or education level (Fradelos et al., 2014).

Pediatric nurses' QOL has been associated with some work-related characteristics. For example, one study found that pediatric nurses working longer hours reported higher compassion fatigue, which indicated lower QOL (Yoder, 2010). Higher compassion fatigue was also predominant among pediatric nurses who were taking care of critically ill or dying patients (Merk, 2018). Moreover, working in pediatric 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, BO was negatively associated with nurses' QOL (Erkorkmaz et al., 2018). Finally, the low QOL and high BO levels among pediatric nurses may negatively impact patient safety (de Lima Garcia et al., 2019; Hall et al., 2016).

Nurses' QOL is an important topic of study because it is related to many professional issues and variables such as job satisfaction (Andresen et al., 2017; H. Khatatbeh, Al-Dwaikat, et al., 2021; Makabe et al., 2018), work environment (Dos Santos et al., 2018), ITL (Andresen et al., 2017), and BO (Garbóczy et al., 2021; Hatamipour et al., 2017; H. Khatatbeh, Pakai, et al., 2021; H. Khatatbeh, Pakai, Zrínyi, et al., 2020; M. Khatatbeh, Khasawneh, et al., 2021). On the other hand, ITL is also crucial because it contributes to nurses' shortage, the global problem (Burmeister et al., 2019), and because it is related to poor nursing care and job satisfaction (Al-Faouri et al., 2020). With the ongoing outbreak of the novel coronavirus (COVID-19) and the associated work stressors (M. Khatatbeh, Khasawneh, et al., 2021), increased attention has been paid to nurses' QOL and ITL (Alrawashdeh et al., 2021).

Previous studies established a negative correlation between nurses' QOL and ITL (Andresen et al., 2017; Burmeister et al., 2019; H. Khatatbeh, Pakai, Pusztai, et al., 2020; Perry et al., 2017). Also previous studies concluded that nurses' ITL is influenced by the type of healthcare institution (Yamaguchi et al., 2016) and that nurses working in a preferred setting would show less ITL (Al Sabei et al., 2020). In Jordan, it was reported that around 60% of nurses in Jordan have high ITL (Raddaha et al., 2012). Several factors were found to be associated with high ITL among nurses in Jordan such as salaries, leadership style, and professional progress (Alhamwan et al., 2015). Similarly, it was found that leadership style affects nurses'

intent to stay in Jordan (Al-Hamdan et al., 2016) and that the work environment is also correlated with nurses' intent to stay in Jordan (Al-Hamdan et al., 2017).

Different types of hospitals exist in Jordan: the ministry of health (MOH) hospitals, the University-Affiliated hospitals, the private hospitals, and the military hospitals. In Jordan, there are only two University-Affiliated hospitals. The first one is the *Jordan University Hospital* which belongs to the *University of Jordan*. The second hospital is the *King Abdullah University Hospital* which belongs to the *Jordan University of Science and Technology*. The University-Affiliated hospitals are independent of other hospitals; they have their management style, salaries, healthcare standards, nursing care model, and staffing levels distinct from the MOH hospitals. We argue that the University-Affiliated hospitals create a more attractive environment that leads to better nurses' QOL and decreases ITL. Based on the relationships established in previous studies (Andresen et al., 2017; Burmeister et al., 2019; Perry et al., 2017; Yamaguchi et al., 2016), we suggest that hospital type might be moderating the relationship between pediatric nurses' QOL and ITL. Figure 2 shows a conceptual model for this proposed relationship.

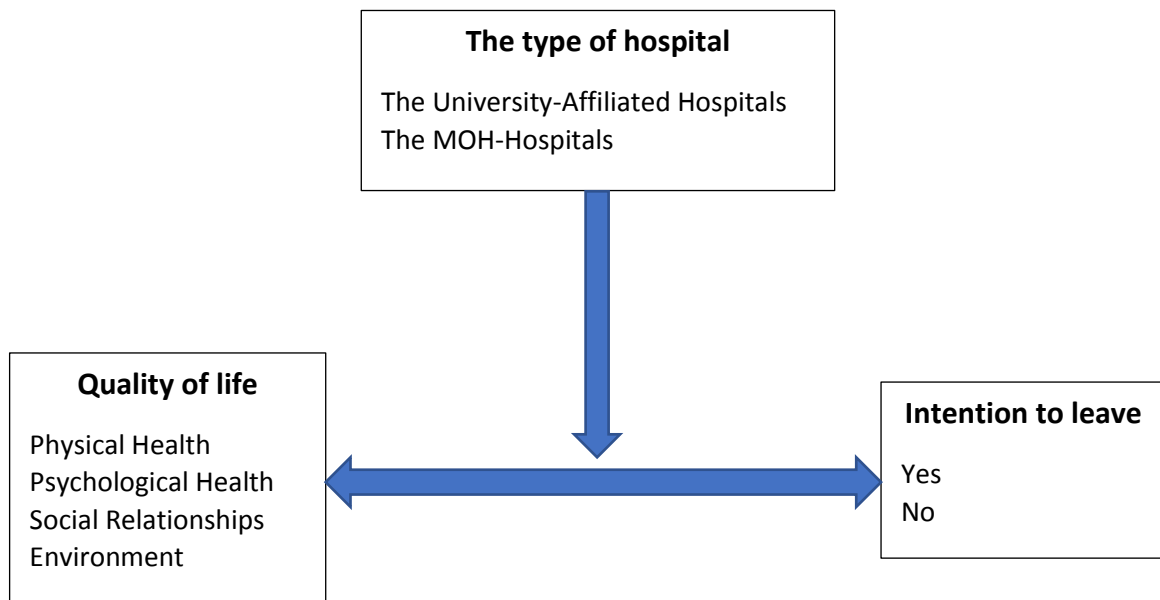


Figure 2. The conceptual model of the relationship between QOL and ITL

1.3. BO theories

To explain BO determinants and outcomes, different theoretical models have been introduced. For example, three BO models have described the BO phenomenon: Golembiewski, Munzenrider and Stevenson model (Golembiewski et al., 1988), Leiter and Maslach's process model (Leiter & Maslach, 1988), and Lee and Ashforth's model (Lee & Ashforth, 1996). Up to our knowledge, few theoretical models have described BO in relation to QOL and patient safety, such as the compassion satisfaction-compassion fatigue (CS-CF) model (H.-J. Kim & Yom, 2014; Stamm, 2010) and the empowerment model (Nursalam et al., 2018). The CS-CF model was introduced in developing the professional QOL (Pro-QOL) scale (Stamm, 2010). This model has classified the consequences of helping others into positive and negative consequences. The positive consequences were described as compassion satisfaction (CS), while the negative consequences were called compassion fatigue (CF) (Stamm, 2010). According to this model, CF is composed of both BO and secondary traumatic stress (Stamm, 2010). The empowerment model was introduced to explain BO syndrome, quality of nursing work life, empowerment, and other work-related variables (Nursalam et al., 2018). According to the empowerment model, nurses' empowerment reduces BO syndrome and improves the quality of nursing work life. We integrated the two models into the CS-CF-empowerment integrated model assuming that patient safety mediates the relationship between work-related variables and BO and that QOL mediates the relationship between work-related variables and BO (Figure 3).

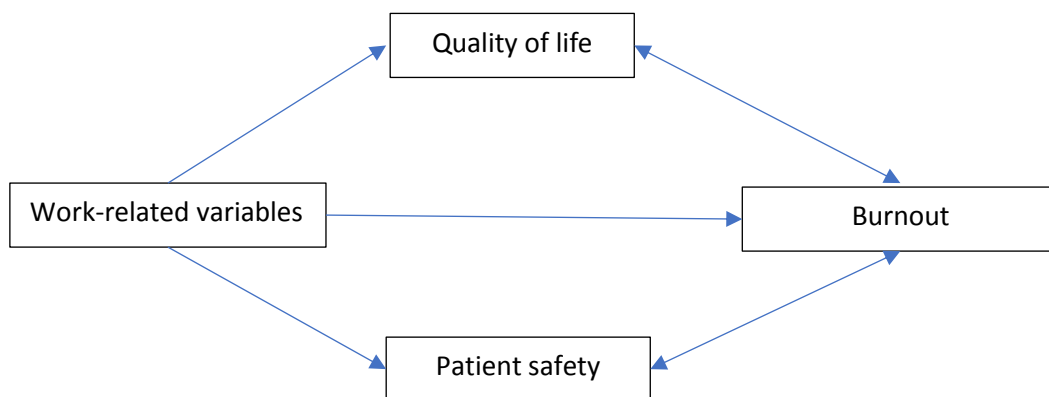


Figure 3. The integrated CS-CF-Empowerment model

1.4. Definitions and measures of BO

BO is defined 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), p.501. BO is also defined as a combination of emotional exhaustion, depersonalization, and reduced personal accomplishment (Maslach & Jackson, 1981). According to Maslach et al. (1986), BO is a syndrome of combined emotional exhaustion, depersonalization, and reduced personal accomplishment. Emotional exhaustion entails a psychological feeling of being unable to give because of depleted emotional resources (Maslach et al., 1986). In depersonalization, the staff becomes unfeeling or hard-hearted with clients (Maslach et al., 1986). The reduced personal accomplishment is to be dissatisfied about own job accomplishments (Maslach et al., 1986). Similarly, World Health Organization (WHO) described BO as a syndrome of exhaustion, feeling of negativism, and decreased personal efficacy due to long-lasting work stress that was not effectively treated (WHO, 2018). On the other hand, Kristensen et al. (2005) described BO’s essence as fatigue and exhaustion, which attribute to different domains in the person’s life. Also, the *Conservation of Resources theory* was used in defining BO as a feeling of emotional exhaustion, physical fatigue, and cognitive weariness (Schilling et al., 2019; Shirom, 2003).

Several measures are available to assess the BO; the Maslach Burnout Inventory (MBI) is the most widely used instrument to measure the individual’s experience of BO (Kristensen et al., 2005). It measures the three aspects of BO syndrome, namely: emotional exhaustion, depersonalization, and personal accomplishment (Kristensen et al., 2005). The MBI is composed of 16-22 Likert-type items depending on the used version, general, human services, students, medical personnel, or educators’ version (Maslach et al., 1986). The Copenhagen Burnout Inventory (CBI) is another valid instrument to measure BO (Kristensen et al., 2005). It was developed as a part of the Danish Project on BO, Motivation, and Job Satisfaction (Borritz et al., 2006; Kristensen et al., 2005). The CBI is composed of 19 Likert-type items to measure three dimensions of BO: personal BO, work-related BO, and client-related BO among professionals who work with clients (Kristensen et al., 2005). The Oldenburg Burnout Inventory (OLBI) is another valid instrument used to measure BO among the various professionals using 16 Likert-type items (Janko & Smeds, 2019; Reis et al., 2015). Like MBI, the OLBI measures BO as a syndrome but encompasses only two dimensions: exhaustion and disengagement from work (Reis et al., 2015). The Shirom–Melamed Burnout Questionnaire (SMBQ) is composed of twelve items to measure BO’s three dimensions, namely emotional exhaustion, physical

fatigue, and cognitive worn-out, as-built according to *Conversation of Resources theory* (Schilling et al., 2019).

Although MBI is considered the golden instrument in measuring BO, Kristensen et al. (2005) criticized the MBI because it measures the three dimensions of BO syndrome independently. This conflicts with Maslach's definition that the three dimensions of BO co-occur (Kristensen et al., 2005). On the other hand, it is unnecessary to use the three CBI subscales to measure the BO (Kristensen et al., 2005). Depending on the target population, only one or two subscales of the CBI can be used (Kristensen et al., 2005). The CBI was translated into other languages and found to have acceptable validity and reliability (Berat et al., 2016; Chin et al., 2018; Fiorilli et al., 2015; Kristensen et al., 2005; Mahmoudi et al., 2017; Yeh et al., 2007).

1.5. Prevention and treatment of BO

Previous studies demonstrated several strategies to reduce the levels of BO. For instance, endurance coaching program was introduced as a possible approach to reduce the levels of BO among nurses (Mealer et al., 2014). This approach depends on teaching nurses how to cope with stressful situations. Another tactic that might be effective in decreasing BO is the meditation (Pipe et al., 2009). Using meditation tactic, nurses concentrate to decrease the stress and ignore sources of stress. Practicing Yoga exercises for eight weeks is another effective strategy to decrease the levels of BO among nurses (Alexander et al., 2015). An intellectual wellbeing program was introduced as an effective manoeuvre in reducing nurses' BO (Mackenzie et al., 2006). In this program, nurses listen to audiotape intellectual-training exercises for 10 minutes a day, five days a week, for four weeks (Mackenzie et al., 2006).

comprehensive interventional programs such as salary increment, decreasing the working hours, and counseling sessions on stress management are needed to prevent nurses' BO and improve their QOL. Moreover, social and manager support should be encouraged to minimize nurses' BO and improve their QOL (Hamaideh, 2011). Also, it is essential to control factors contributing to BO, such as high workload and low satisfaction (Van Bogaert et al., 2013).

1.6. Definitions and measures of QOL

QOL is a general and relatively new expression that replaced old words like happiness and well-being (Serinkan & Kaymakçi, 2013). QOL is defined by WHO as a humans' impression about their situation in life within their environment regarding their aims, values, prospects, and worries (WHO, 1997). Also, professional QOL (ProQOL) is a subtype of the QOL for helping others to overcome their suffering and trauma (Stamm, 2010).

Several measures are available to assess the QOL; WHO developed one of the most important tools to measure QOL (WHOQOL). WHOQOL comprises 100 Likert-type items covering six main areas: physical health, psychological health, social relationships, and environment, the level of independence, and spirituality (WHOQOL-Group, 1998). The short version of WHOQOL is WHOQOL-BREF, which comprises 26 Likert-type items that cover four main areas: physical health, psychological health, social relationships, and environment (WHOQOL-Group, 1998). The Short-Form Health Survey (SF-36) is another tool to assess QOL. SF-36 is composed of 36-items measuring physical and psychological dimensions (Ware JR & Sherbourne, 1992). The physical health domains in SF-36 are physical working, physical role, pain, and overall health (Ware JR & Sherbourne, 1992). On the other hand, the mental health domains in SF-36 are vitality, social functioning, emotional role, and psychological health (Ware JR & Sherbourne, 1992). SF-36 was further shortened into SF-12, measuring only two dimensions physical and mental component (Ware et al., 1994). ProQOL tool is composed of 30 Likert-type items to assess QOL (Stamm, 2010). ProQOL measures both positive and negative consequences of dealing with humans suffering from traumatic situations (Stamm, 2010). ProQOL measures CS and CF, which is composed of BO and Secondary Traumatic Stress (Stamm, 2010). CS is to like and be happy doing your job tasks effectively (Stamm, 2010). As a CF sub-domain, BO was described as a feeling of hopelessness and problems dealing with work or doing your tasks well (Stamm, 2010). Secondary Traumatic Stress is related to job nature and interaction with persons complaining of severe stressful situations (Stamm, 2010).

Although WHOQOL, SF-36, and ProQOL are the most widely used tools to measure QOL, some researchers used other validated tools. For instance, the Work-Related Quality of Life Scale (WR-QOLS) is another validated questionnaire measuring QOL. WR-QOLS assesses six dimensions of QOL: general well-being, home-work interface, job and career satisfaction, control at work, working conditions, and stress at work (Casida et al., 2019; Q. Q. Wang et al., 2019). WR-QOLS comprises 23 items of 5-point Likert-type scale ranging from

strongly disagree to strongly agree (Casida et al., 2019; Q. Q. Wang et al., 2019). Additionally, Work-Life Quality (QWL) encompasses 35-items measuring eight dimensions of work-related QOL (Permarupan et al., 2020). Last, another QOL scale comprises 28-items assessing four dimensions: working life, social life, BO, and satisfaction (Çelmeçe & Menekay, 2020).

1.7. The Nurse-Perceived Patient Adverse Events (NPPAES)

Adverse events are those avoidable outcomes that result from wrong health care services, not from the disease itself (Van den Bos et al., 2011). Adverse events are common in all hospitals; they are considered an important aspect of patient safety. It is estimated that around 440,000 people died in United States because of avoidable 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 defined as the preventable consequences of incorrect healthcare services (Van den Bos et al., 2011). Because of the sensitivity of this issue, it is usually assessed by asking nurses about the perceived frequency, rate, or number of adverse events, which is referred to “nurse-perceived patient adverse events” (Cho et al., 2016; Van Bogaert et al., 2014). The most common types of NPPAEs are medication errors, nosocomial infections, pressure ulcers, and falls.

1.8. Significance of the topic

BO is getting an increasing attention because of its consequences. The consequences of BO are numerous; they include patient dissatisfaction (Manzano-García & Ayala, 2017), physical symptoms such as musculoskeletal symptoms, mental symptoms such as depression, and job-related effects such as absenteeism (Salvagioni et al., 2017). Nurses are known to be vulnerable to high BO and low QOL because of the complicated work environment (Chou et al., 2014; Gómez-Urquiza et al., 2017; Manzano-García & Ayala, 2017; Messias et al., 2019). However, pediatric nurses are a small proportion of the nurses (Buckley et al., 2020), and remain under-represented in the literature.

For several reasons, we argue that pediatric nursing is a challenging subfield of nursing. For instance, pediatric nurses deal with children who are afraid from the hospital environment. Moreover, the children are sometimes critically ill (Buckley et al., 2020; H. Khatatbeh, Pakai, Pusztai, et al., 2020), and pediatric nurses have to care about worried parents at the same time as they care for their children (Buckley et al., 2020; H. Khatatbeh, Al-Dwaikat, et al., 2021).

As a small proportion of the larger nursing community, there is a lack of studies discussing how pediatric nurses are affected by BO (Buckley et al., 2020). Indeed, previous studies on pediatric nurses' BO have focused solely on neonatal intensive care units' nurses (Amin et al., 2015; Aytekin et al., 2013; Skorobogatova et al., 2017).

The impact of demographic and work-related characteristics on BO, QOL, and NPPAEs, as well as the relationships between them, are not yet well understood among the pediatric nurse community. Therefore, further research is needed regarding pediatric nurses' BO (Buckley et al., 2020) and its correlates especially during the COVID-19 pandemic.

Till now, no efforts have yet been made to combine the CS-CF and empowerment models into one theoretical model; i.e., the integrated CS-CF-Empowerment. Also, to the best of our knowledge, no previous studies have explored the moderating role of hospital type in the relationship between pediatric nurses' QOL and ITL, and the moderating role of work shift in the relationship between pediatric nurses' BO and their perceived health.

2. Purpose of the study

This study aims to assess the relationships between pediatric nurses' BO, QOL, NPPAEs, and demographic and work-related characteristics.

2.1. Aims

- To systematically review the relationship between nurses' BO and their QOL.
- To measure Jordanian pediatric nurses' scores regarding BO, QOL, and perceived patient adverse events during the COVID-19 pandemic.
- To assess the associations between BO, QOL, and NPPAEs.
- To assess the relationships between pediatric nurses' demographic and work-related characteristics and their BO, QOL, and NPPAEs.
- To assess the extent to which integrating the CS-CF and empowerment models can explain the relationships between pediatric nurses' BO, QOL, perceived patient safety, and work-related variables during the COVID-19 pandemic.
- To explore the relationship between pediatric nurses' QOL and their ITL, and the moderating role of hospital type in this relationship.
- To compare QOL of pediatric nurses working at university-affiliated hospitals and those working at ministry of health (MOH) hospitals.
- To explore the determinants of pediatric nurses' intent to leave.
- To examine the relationship between pediatric nurses' BO and their perceived health, and the moderating effect of work shift on this relationship.
- To compare BO and perceived health between pediatric nurses working on day shifts and those working on night/ alternate shifts.

2.2. Theoretical framework of the dissertation

Different theoretical models have been introduced in the literature to explain the determinants and consequences of BO. Up to our knowledge, two theoretical models have described BO in relation to QOL and patient safety, namely: the compassion satisfaction-compassion fatigue (CS-CF) model (H.-J. Kim & Yom, 2014), and the empowerment model (Nursalam et al., 2018). As the two models have attempted to describe the BO concerning either QOL or patient safety, integrating these two models together would enhance the understanding of BO determinants and outcomes.

The CS-CF model was introduced in developing the ProQOL scale (Stamm, 2010). This model has classified the consequences of helping others into positive consequences called *compassion satisfaction* (CS), and negative consequences called *compassion fatigue* (CF). According to this model, CF is composed of both BO and secondary traumatic stress. The CS-CF model was later applied to Korean nurses' BO (H.-J. Kim & Yom, 2014). According to the CS-CF model, the nursing work environment predicted CS, CF, and patient safety. Additionally, patient safety culture was a predictor for both CS and CF. So, it can be noticed that the CS-CF model connects BO, QOL, and patient safety concepts altogether. On the other hand, the empowerment model was introduced to explain BO syndrome, quality of nursing work life, empowerment, and other work-related variables (Nursalam et al., 2018). According to the empowerment model, nurses' empowerment reduces BO syndrome and improves the quality of nursing work life.

Based on these concepts, a multifactorial model examining the causes and consequences of nurses' BO was built in three steps. First, the two models were integrated into the *integrated CS-CF-Empowerment model*. According to the empowerment model, it is assumed that QOL mediates the relationship between work-related variables and BO. Also, it was assumed that patient safety mediates the relationship between work-related variables and BO according to the CS-CF model. The second step was done by integrating the relationships between pediatric nurses' social support, job satisfaction, and NPPAEs were integrated into the multifactorial model. The last step was done by integrating the moderating roles of the common work-shift and the type of hospital. The moderating role of the common work-shift in the relationship between BO and the perceived health, and the moderating role of the hospital type in the relationship between QOL and ITL, as shown in Figure 4.

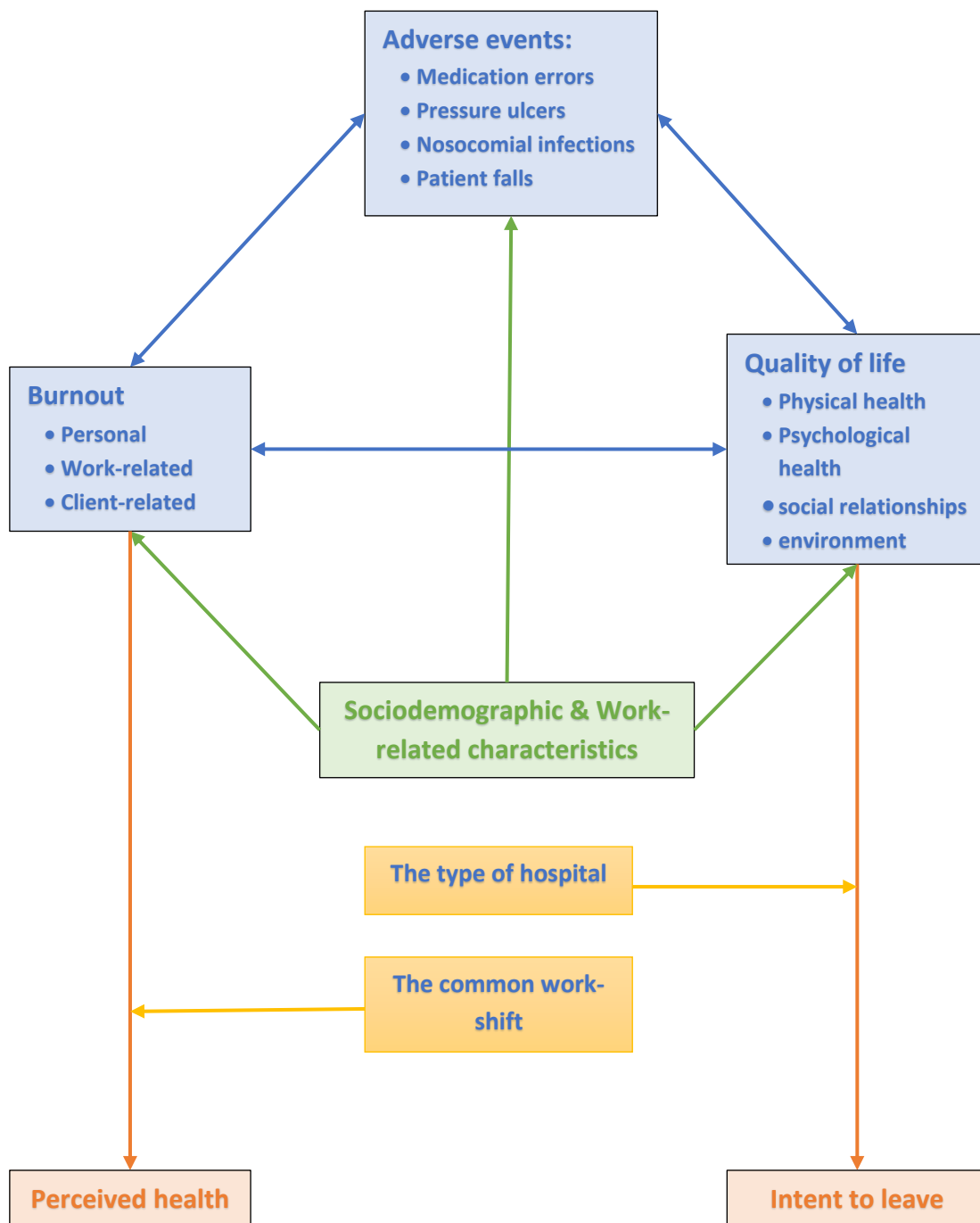


Figure 4. The multifactorial model to examine the causes and consequences of nurses' BO

3. Nurses' burnout and quality of life: A systematic review

3.1. Methods

PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) were followed to perform this systematic review (Liberati et al., 2009). PRISMA includes evidence-based items for reporting systematic reviews and meta-analyses (Liberati et al., 2009). PRISMA illustrates how researchers can ensure the objective and complete reporting of systematic reviews and meta-analyses (Liberati et al., 2009).

3.1.1. Search strategy

Five electronic databases CINAHL, PubMed, Medline, Psychology and Behavioral Sciences Collection, and Google Scholar, were selected for this systematic review. These databases were selected because they include bibliographic information for articles covering our research topic: nursing and psychology. Two members of the review team searched the chosen databases in April 2021. First, the terms “nurses AND burnout AND quality of life” were used to find the MeSH terms on PubMed. The command line used in searching PubMed was (“Nurses”[Mesh]) AND “Burnout, Professional”[Mesh]) AND “Quality of Life”[Majr]. Searching restrictions included English language, scholarly journals, and last twelve years publications (2009-2021).

3.1.2. Study selection

To ensure the reliability of the study selection process, it was independently done by two members of the review team. The selection process started by screening titles and abstracts, followed by full reading for the initially selected studies. The chosen studies meeting the inclusion criteria were finally assessed for possible methodological bias using Ciapponi's critical reading checklist. To resolve any disagreement, a third member of the review team was consulted. Figure 5. Shows the PRISMA flow diagram.

3.1.3. Quality Assessment

According to similar systematic reviews (De La Fuente-Solana et al., 2019; Gómez-Urquiza et al., 2017; Monsalve Reyes et al., 2018) and because all of the included articles were cross-sectional studies, items related to internal validity (2, 3, 4,5, 6, 11, 12, 13, 14-b, 15, 16, 17 and 18) from Ciapponi's critical reading checklist (Ciapponi, 2010) were used to assess the quality of the articles. Each article was assessed for methodological quality, and no one was excluded for a methodological bias.

3.1.4. Inclusion criteria

According to the predetermined inclusion criteria for this systematic review, we included only the cross-sectional and peer-reviewed studies measuring both nurses' BO and QOL using separate validated measures. The exclusion criteria were: (a) studies that didn't measure both BO and QOL, (b) studies that did not specify proportion or number of the nurses, (c) psychometric studies, (d) qualitative studies as they don't provide numerical measurements BO and QOL, (e) interventional studies, (f) preprints, and (g) studies with other languages.

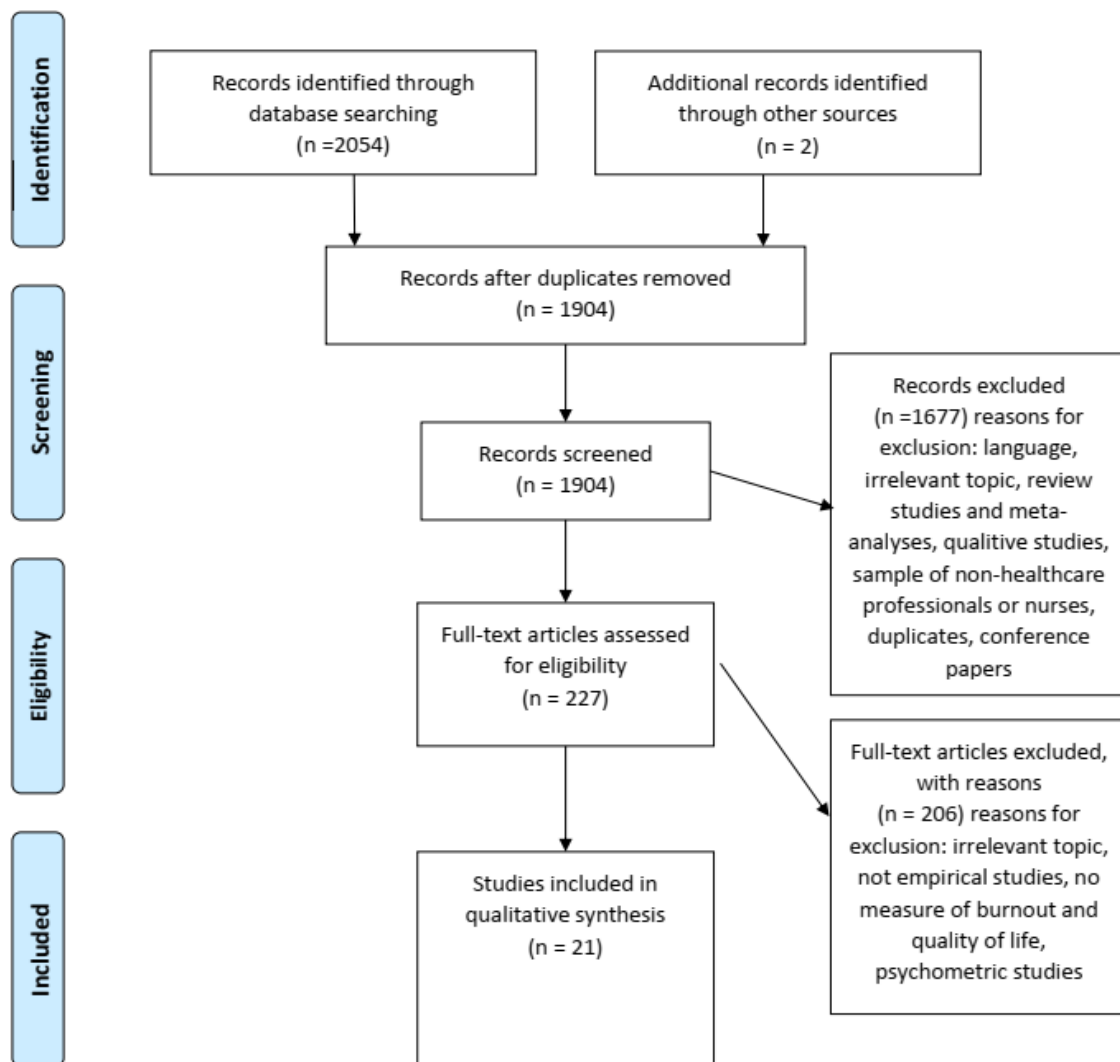


Figure 5. PRISMA flow diagram

3.1.5. Data extraction

After applying the predetermined inclusion and exclusion criteria for the search performed in April 2021, 21 studies were included in this systematic review (Fig 1). Most of the studies (n = 12) included were from China, Turkey, Iran, Greece, or Pakistan (Aytekin et al., 2013; Azari & Rasouyar, 2016; Çelmeçe & Menekay, 2020; Erkorkmaz et al., 2018; Fradelos et al., 2014; Hatamipour et al., 2017; Kelleci et al., 2011; Naz et al., 2016; Paniora et al., 2017; Q. Q. Wang et al., 2019; Wu et al., 2011; L. N. Zeng et al., 2020). The rest of the studies were from Brazil (Ribeiro et al., 2021), Egypt (Abdel-Aziz & Adam, 2020), Korea (Y. Kim et al., 2019), India (Abraham & D’Silva, 2013), Jordan (H. Khatatbeh, Pakai, Pusztai, et al., 2020), Malaysia (Permarupan et al., 2020), Poland (Kupcewicz & Jóźwik, 2020), Saudi Arabia (Alotni & Elgazzar, 2020), and the USA (Casida et al., 2019). All of the studies included in this systematic review utilized a cross-sectional design, and most of them (n=11) were published between 2019-2021, Table 1.

Table 1. Results of searching electronic databases

Database	Articles Found
CINAHL	1364
PubMed	142
Medline	402
Psychology and Behavioral Sciences Collection	108
Google Scholar	38
Total	2054

For the 21 included articles, the following information was independently extracted by two researchers: a) the first author’s surname, b) year of publication, c) research design, d) sampling method and size, e) BO instrument, f) QOL instrument, and g) results. If there was a disagreement about a certain article, a third member of the research team was consulted until an agreement was reached.

3.2. Results

3.2.1. *Summary of the reviewed studies*

The total number of nurses in the 21 included studies was 9859. Regarding the gender of participants, three studies surveyed only female nurses (Azari & Rasouyar, 2016; Naz et al., 2016; Wu et al., 2011). Concerning the profession of participants, one of these studies compared female nurses to female doctors (Wu et al., 2011), another study compared nurses to nurse educators (Abraham & D'Silva, 2013), and one study studied different healthcare providers, including nurses (Çelmeçe & Menekay, 2020). Regarding the working area of the participants, four studies surveyed mental nurses (Abdel-Aziz & Adam, 2020; Fradelos et al., 2014; Paniora et al., 2017; L. N. Zeng et al., 2020), one study surveyed only Neonatal Intensive Care Unit (NICU) nurses (Aytekin et al., 2013), one study surveyed pediatric nurses (H. Khatatbeh, Pakai, Pusztai, et al., 2020), one study surveyed emergency nurses (Ribeiro et al., 2021), and one study included nurses working at critical care units (Alotni & Elgazzar, 2020). Also, one study surveyed nurses caring for COVID-19 patients (Çelmeçe & Menekay, 2020). (Table 2).

Table 2. Summary of the included studies

	Author, Year, Country	Study Design	Sampling method & size	BO Instru- ment	QOL Instru- ment	Main Results
1.	Abdel-Aziz & Adam, 2020 Egypt	Descriptive, Correlational	A purposive sample, 100 psychiatric nurses	MBI-22 items	ProQOL-30 items	A high significant relationship was found between nurses' BO and their professional QOL
2.	Abraham & D'silva, 2013 India	Descriptive, Cross-Sectional	Random sampling, 50 nurses	Shirom- Melamed BO inventory	WHOQOL-BREF (26 items)	Significant weak negative correlation between BO and both psychological QOL and social QOL
3.	Alotni & Elgazzar, 2020 Saudi Arabia	Descriptive, Correlational	A purposive sample, 170 critical care nurses	MBI-22 items	Short Form Health Survey -12 (SF12)	BO and QOL are significantly and negatively correlated
4.	(Aytekin et al., 2014 Turkey	Descriptive, Correlational	2 hospitals total population sampling, 80 NICU nurses	MBI-22 items	WHOQOL-BREF (26 items)	As BO level increased, the QOL of the nurses decreased
5.	Azari & Rasouyar, 2016 Iran	Descriptive, Correlational	Simple random sampling, 150 Female nurses	MBI-22 items	Short Form Health Survey -36 (SF36)	Significant correlation between QOL and its components, with of job BO
6.	Casida et al., 2019 USA	Exploratory, correlational	A random sample, 104 nurse practitioners	CBI-19 items	WR-QOLS 23 items	A negative correlation found between work-related BO and quality of work-life

7.	Çelmeçe & Menekay, 2020 Pakistan	Descriptive, Cross-Sectional	Convenient sample 120 nurses	MBI-22 items	Menekay & Çelmeçe QOL 28-items	Healthcare providers and nurses QOL is affected by BO.
8.	Erkorkmaz et al., 2018 Turkey	Analytical, Cross-Sectional	Voluntary sample from one hospital, 131 nurses	MBI-22 items	ProQOL-30 items	Emotional Exhaustion and Personal Accomplishment significantly affected CS
9.	Fradelos et al., 2014 Greece	Descriptive, Cross-Sectional	139 nurses general and mental hospitals	MBI-22 items	Short Form Health Survey -36 (SF36)	BO impacts QOL of nurses
10	Hatamipour et al., 2017 Iran	Descriptive, Cross-Sectional	Multi-stage cluster sampling, 400 nurses	MBI-22 items	WHOQOL-BREF (26 items)	BO had a negative and significant relationship with QOL and Perceived social support
11	Kelleci et al., 2011 Turkey	Descriptive, Cross-Sectional	Cluster sampling for 3 hospitals, 439 nurses	MBI-22 items	WHOQOL-BREF (26 items)	There was a negative relationship between all subdimensions of QOL and exhaustion and desensitization scores
12	Khatatbeh et al., 2020 Jordan	Descriptive, Cross-Sectional	Convenient sample 225 pediatric nurses	CBI-19 items	WHOQOL-BREF (26 items)	The three CBI subscales were negatively correlated with the four QOL subscales
13	Kim et al., 2019 Korea	Descriptive, Cross-Sectional	Convenient sample 324 nurses	MBI-22 items	ProQOL-30 items	The three MBI subscales were significantly correlated with the two ProQOL subscales
14	Kupcewicz & Józwik., 2020 Poland	Comparative, Cross-Sectional	Convenient sample 1806 nurses	CBI-19 items	WHOQOL-BREF (26 items)	The three CBI subscales were found explaining nurses QOL
15	Naz et al., 2016 Pakistan	Descriptive, Cross-Sectional	Convenience sampling, 106 Female nurses	MBI-22 items	WHOQOL-BREF (26 items)	Nurses' BO was common because of increasing workload can negatively affect their QOL

16	Paniora et al., 2017 Greece	Descriptive, Cross-Sectional	Convenience sampling, 100 mental health nurses	MBI-22 items	Short Form Health Survey -36 (SF36)	Psychiatric nurses have low levels of BO. Levels of physical activity are correlated with both QOL and BO syndrome
17	Permarupan et al., 2020 Malaysia	Descriptive, Cross-Sectional	Convenience sampling, 432 nurses	MBI-13 items	Walton QWL 35-items	The psychological empowerment mediates the relationship between quality of work-life and BO
18	Ribeiro et al., 2021 Brazil	Analytical, Cross-Sectional	Convenience sampling, 83 emergency nurses	MBI-22 items	Short Form Health Survey -36 (SF36)	The BO has an influence on nurses' QOL
19	Wang et al., 2019 China	Cross-Sectional, E-mail based survey	multistage stratified cluster random sampling 2504 nurses	Chinese MBI-15 items	WR-QOLS 23 items	Job BO has a negative effect on nurses' quality of work-life
20	Wu et al., 2011 China	Comparative, Cross-Sectional	Stratified cluster sampling, 947 female nurses	(MBI-GS) 16 items	Short Form Health Survey -36 (SF36)	Improving nursing working environment is an efficient preventive measure for reducing occupational stress to prevent job BO and improve QOL among female nurses
21	Zeng et al., 2020 China	Descriptive, Cross-Sectional	Convenience sampling, 1449 Psychiatric nurses	Chinese MBI-15 items	WHOQOL-BREF (26 items)	BO negatively impacted nurses QOL

3.2.2. Definition of BO and QOL in the reviewed studies

The definition of Maslach & Jackson (1986) was explicitly adopted by five studies (Aytekin et al., 2013; Erkorkmaz et al., 2018; Hatamipour et al., 2017; Wu et al., 2011; L. N. Zeng et al., 2020). Six studies implicitly adopted Maslach & Jackson's (1981) definition of BO because they used the MBI without including a BO definition (Abraham & D'Silva, 2013; Azari & Rasouyar, 2016; Çelmeçe & Menekay, 2020; Y. Kim et al., 2019; Permarupan et al., 2020; Ribeiro et al., 2021). Two studies adopted the definition of Freudenberg (1974), which described BO as bodily and behavioral signs and symptoms caused by physical and psychological tiredness (Paniora et al., 2017; Q. Q. Wang et al., 2019). One study defined BO as a chronic mental syndrome that results from social stressors (Abdel-Aziz & Adam, 2020).

QOL was described in three studies as the bodily, psychological, and social health interacting with the environment (Aytekin et al., 2013; Erkorkmaz et al., 2018; Paniora et al., 2017). Similarly, other studies (n=3) described QOL as a vital feature of human well-being established in a bodily, public, and community frame (Fradelos et al., 2014; Naz et al., 2016; Wu et al., 2011). Another study by Azari et al. (2016) described QOL as a multidimensional and multifaceted concept characterized by objective and subjective features and helps finally to assess human well-being (Azari & Rasouyar, 2016). On the other hand, six studies have adopted the definition of the WHO (Abraham & D'silva, 2013; Alotni & Elgazzar, 2020; Hatamipour et al., 2017; Kelleci et al., 2011; Kupcewicz & Józwick, 2020; Ribeiro et al., 2021). Last, some studies examined work-related or professional QOL, not general QOL (Abdel-Aziz & Adam, 2020; Casida et al., 2019; Erkorkmaz et al., 2018; Y. Kim et al., 2019).

3.2.3. Measures of BO and QOL used in the reviewed studies

Out of the 21 studies included in this review, 17 studies measured BO using a version of MBI (Abdel-Aziz & Adam, 2020; Alotni & Elgazzar, 2020; Aytekin et al., 2013; Azari & Rasouyar, 2016; Çelmeçe & Menekay, 2020; Erkorkmaz et al., 2018; Fradelos et al., 2014; Hatamipour et al., 2017; Kelleci et al., 2011; Y. Kim et al., 2019; Naz et al., 2016; Paniora et al., 2017; Permarupan et al., 2020; Ribeiro et al., 2021; Q. Q. Wang et al., 2019; Wu et al., 2011; L. N. Zeng et al., 2020). Three studies used the CBI (Casida et al., 2019; H. Khatatbeh, Pakai, Pusztai, et al., 2020; Kupcewicz & Józwick, 2020), and one study used Shirom-Melamed BO inventory (Abraham & D'Silva, 2013). To measure nurses' QOL, the included 21 studies have used either WHOQOL-BREF (n=8), SF-36 or SF-12 (n=6), ProQOL (n=3), or another tool (n=4). Most of the included studies found moderate to high levels of BO. However, psychiatric nurses showed low levels of BO in one study (Paniora et al., 2017).

3.2.4. *The relationship between BO and QOL in the reviewed studies*

The majority of the studies (n=16) found a negative correlation between nurses' BO and their QOL or professional QOL (Abdel-Aziz & Adam, 2020; Abraham & D'Silva, 2013; Alotni & Elgazzar, 2020; Aytekin et al., 2013; Casida et al., 2019; Erkorkmaz et al., 2018; Fradelos et al., 2014; Hatamipour et al., 2017; Kelleci et al., 2011; H. Khatatbeh, Pakai, Pusztai, et al., 2020; Y. Kim et al., 2019; Kupcewicz & Jóźwik, 2020; Permarupan et al., 2020; Ribeiro et al., 2021; Q. Q. Wang et al., 2019; L. N. Zeng et al., 2020). For example, nurses' QOL was negatively correlated with emotional exhaustion and depersonalization, and positively with personal accomplishment (Kelleci et al., 2011). Similarly, the emotional exhaustion among NICU nurses was negatively associated with all QOL subscales; and depersonalization was negatively associated with physical, psychological health, and social relationships subscales (Aytekin et al., 2013). Two domains of QOL, psychological and social relationships, were negatively correlated with BO (Abraham & D'Silva, 2013). Similarly, another study found that personal accomplishment affects nurses' QOL (Erkorkmaz et al., 2018). One study found a significant correlation between emotional exhaustion and QOL measured by SF-36 (Azari & Rasouyar, 2016). An intermediate effect was found for emotional exhaustion on CF, the subscale of ProQOL (Erkorkmaz et al., 2018). Similar results were found between the depersonalization subscale and two subscales of ProQOL: BO and CF (Erkorkmaz et al., 2018). Another study found a strong negative correlation between both emotional exhaustion and depersonalization with nurses' QOL (Fradelos et al., 2014). Also, some studies (n=4) found that professional or work-related QOL was also negatively associated with nurses' BO (Abdel-Aziz & Adam, 2020; Casida et al., 2019; Y. Kim et al., 2019; Q. Q. Wang et al., 2019).

3.3. Discussion

Assessment of nurses' BO, their QOL, and the relationship between BO and QOL were the aims of this systematic review. The high levels of nurses' BO in the reviewed articles were explained by the challenging work conditions and working environments such as changing shifts, low nurse-to-patient ratio, and poor teamwork and collaboration with other healthcare workers (Erkorkmaz et al., 2018). However, the varying levels of BO across the included studies can be explained by the various working environments such as unit/ward, the different working shifts, and the different working loads. For example, some studies studied only NICU, mental, critical, or pediatric nurses; and some studies included only one or two hospitals in

their studies. The NICU's busy environment, the critical patients' cases, ventilator sounds, and cardiac monitor alarms might make the nurses more susceptible to BO than those in other units. Furthermore, the nurses who work on the night or alternate shifts and the associated sleep problems might have higher BO than other nurses who work on the day and regular shifts. For instance, the low BO levels found among psychiatric nurses in the study of Paniora et al., (2017) might not be generalizable to all nurses because of the low sample size. However, this finding is relatively consistent with a study that revealed low to moderate scores on MBI subscales (Kilfedder et al., 2001). On the other hand, this result is different from a previous study that showed moderate to high scores on MBI subscales (Hamaideh, 2011).

Most of the included studies have explicitly concluded that nurses' BO or its' subscales negatively impacts their QOL or its' subscales (Abraham & D'Silva, 2013; Alotni & Elgazzar, 2020; Aytekin et al., 2013; Fradelos et al., 2014; Hatamipour et al., 2017; Kelleci et al., 2011; H. Khatatbeh, Pakai, Pusztai, et al., 2020; Kupcewicz & Jóźwik, 2020; Ribeiro et al., 2021; L. N. Zeng et al., 2020). Similarly, some of the included studies found a negative association between professional or work-related QOL and nurses' BO (Abdel-Aziz & Adam, 2020; Casida et al., 2019; Erkorkmaz et al., 2018; Y. Kim et al., 2019; Permarupan et al., 2020; Q. Q. Wang et al., 2019). Although some studies didn't find a significant correlation between nurses' BO and QOL, they found moderate to high levels of BO and relatively poor QOL (Kupcewicz & Jóźwik, 2020; Naz et al., 2016; Paniora et al., 2017; Permarupan et al., 2020; Wu et al., 2011).

In the study of Kelleci et al. (2011), the negative relationship between nurses' BO and their QOL was explained by their low job satisfaction. In the study of Aytekin et al. (2014), the moderate levels of nurses' BO impacting their QOL might be explained by NICU's environment and high workload. The low personal accomplishment scores and their relationship with QOL, in the study of Erkorkmaz et al. (2018), were explained by the high occupational stress.

Due to their impact on nurses' health and patient care, comprehensive interventional programs such as salary increment, decreasing the working hours, and counseling sessions on stress management are needed to prevent nurses' BO and improve their QOL. Moreover, social and manager support are also essential to prevent nurses' BO and improve their QOL (Hamaideh, 2011), improving the patient safety and quality of nursing care provided to their patients (H. Khatatbeh, Pakai, Pusztai, et al., 2020). Furthermore, it is essential to control the reasons that initially make nurses susceptible to BO, such as high workload and low satisfaction

(Van Bogaert et al., 2013). Traditional and social media can be utilized in showing the bright sides of the nursing profession to enhance respect for nurses, improving the teamwork and collaboration between nurses and other healthcare professionals, and teaching nurses the necessary coping skills and strategies to deal with stressors.

Our systematic review suggests that nurses are complaining of moderate to high levels of BO. Also, the high levels of BO among nurses are negatively associated with low QOL. So, nurses' BO needs to be controlled because it might affect their QOL and the quality of nursing care. Many possible measures that might decrease nurses' BO and improve their QOL, such as manager support (H. Khatatbeh, Pakai, Pusztai, et al., 2020), counseling sessions, and monetary bonuses. Other targeted interventions might be helpful in addressing the demographic factors such as gender, unit, and shift that were found to be associated with higher levels of BO and/or lower QOL scores. For instance, female nurses who are married or having families to care for should get more off-days, nurses working in critical care units should be assigned to fewer cases, and nurses who work on alternate shifts should get more off days or longer break times.

3.4. Limitations

A key problem with some of the studies included in this systematic review is the small sample sizes (Abdel-Aziz & Adam, 2020; Abraham & D'Silva, 2013; Alotni & Elgazzar, 2020; Aytakin et al., 2013; Azari & Rasouyar, 2016; Casida et al., 2019; Çelmeçe & Menekay, 2020; Erkorkmaz et al., 2018; Fradelos et al., 2014; Naz et al., 2016; Paniora et al., 2017; Ribeiro et al., 2021). Moreover, three studies selected nurses from only one or two hospitals (Aytakin et al., 2013; Erkorkmaz et al., 2018; Wu et al., 2011). Additionally, three studies (Alotni & Elgazzar, 2020; Aytakin et al., 2013; Ribeiro et al., 2021) have studied nurses working at critical care units, who have more stressful environment than other nurses. This systematic review might also be limited by including only those studies in English and excluding qualitative studies. Last, the different tools used in the included studies to measure BO and QOL might be another limitation. Future systematic reviews are encouraged to have meta-analysis by including studies using the same measures. However, the studies included in this systematic review were peer-reviewed, were done in different countries and continents, and included nurses working in different working areas.

3.5. Conclusion

This systematic review aimed to assess the relationship between nurses' BO and QOL. The review results showed moderate to high levels of BO across the included studies, varying levels of QOL, and negative relationships between BO and QOL. MBI remains the most widely used instrument in assessing nurses' BO. Both WHOQOL-BREF and SF-36 are the most used tools in measuring nurses' QOL. As compared to general nurses, pediatric nurses in Jordan remain underrepresented in the BO and QOL studies.

4. A cross-sectional study on burnout, quality of life, and perceived patient adverse events among pediatric nurses in Jordan during the COVID-19 pandemic

4.1. Methods

4.1.1. Design

A cross-sectional design was used in this study. The institutional review boards ethically approved the study at the settings where the data was collected. This study took place at pediatric wards/units of eight governmental hospitals and a university-affiliated hospital in Jordan. The majority of the Jordan population lives in the northern and central regions (Department of Jordanian Statistics, 2018). Therefore, only one hospital was selected from the southern region. The rest of the hospitals were selected from the northern and central regions of the country.

4.1.2. Sampling

A convenient sample of 225 pediatric nurses was selected to represent the pediatric nurses in Jordan. Inclusion criteria were holding at least a nursing diploma, working in a pediatric ward/unit for at least one year, and having an annual or permanent contract.

4.1.3. Measures

Nurses were asked about some demographic characteristics such as age, gender, marital status, experience, and education.

BO was assessed using the CBI which is composed of 19 Likert-type items (never to always and very low degree to very high degree) to measure three domains of BO: personal, work-related, and client-related BO. Each item is given a score (0, 25, 50, 75, or 100); the higher score indicates more BO. Each domain's score is calculated by taking the average scores of its items (Kristensen et al., 2005).

The QOL was assessed using the brief instrument of World Health Organization QOL (WHOQOL-BREF). The WHOQOL-BREF comprises 26 questions (using a 5-point Likert scale) that assess four domains, namely: Physical Health, Psychological Health, Social Relationships, and Environment (WHO, 1996).

Patient adverse events were measured using four items assessing the NPPAEs. The items were adopted from two previous studies (Cho et al., 2016; Van Bogaert et al., 2014). Using a 6-point Likert scale (ranging from ‘never’ to ‘every day’), nurses were asked about the frequency of four patient adverse events: medication errors, nosocomial infection, patient falls, and pressure ulcers.

The work-related variables assessed were the hospital type, job satisfaction, intent to leave, usual work shift, weekly work hours, manager support, co-worker support, participation in continuous education, satisfaction with the monthly salary, and exposure to violence. The perceived manager and co-workers’ support were assessed by 5-point scales (very weak, very good). Similarly, nurses were asked about job satisfaction using 5-point scales (very poor, very good). Satisfaction with the monthly salary, intent to leave, and hospital type were assessed using dichotomous questions (enough/ not enough, yes/no, and governmental or university-affiliated, respectively). Nurses were asked about participation in continuous education using a 4-point scale (‘never’ to ‘always’). Using a multiple-answer question, nurses were also asked about the type of violence they experienced (no violence, verbal, psychological, physical). Continuous numeric scales were used to ask nurses about their weekly work hours. Nurses were also asked to choose their usual work shifts (day, night, or alternate shifts). Using a 5-point Likert item, nurses were asked about their perceived health (weak, excellent).

4.1.4. Reliability

The Cronbach’s alpha for the three domains of CBI ranged from 0.85 to 0.87 (Kristensen et al., 2005), close to the reliabilities obtained in this study, 0.83 to 0.90. The Cronbach’s alpha for the four domains of the WHOQOL-BREF ranged from 0.66 (for Social Relationships) to 0.84 (for Physical Health domain), which reflects acceptable reliability (WHOQOL-Group, 1998). In this study, the Cronbach’s alpha for the four domains of the WHOQOL-BREF ranged from 0.70 (for both physical and psychological health) to 0.85 (for the environment). Regarding the NPPAEs, the Cronbach’s alpha in previous studies were more than 0.80 reflecting a good internal consistency (Van Bogaert et al., 2014), which is similar to this study’s Cronbach’s alpha (0.83).

4.1.5. Data Collection

Printed surveys were handed over to nurse managers who distributed them to staff. Surveys were voluntary and anonymous, completed items were placed in a sealed envelope and returned to nurse managers. Surveys were collected by the researcher a day later. The data was

collected in the beginning of COVID-19 pandemic between December 2019 and March 2020. English is the official education language at nursing schools in Jordan; so, the English versions of the CBI, WHOQOL-BREF, NPPAEs, and the work-related variables were used.

4.1.6. Ethical Considerations

The necessary ethical approvals were obtained before research implementation both from the Scientific Research Committee at the Jordanian Ministry of Health (reg. # 21114) as well as from the Ethics Committee at King Abdullah University Hospital (reg. # 13-3-17). Each participant was asked to sign the consent form on the cover sheet. The consent form assured voluntary and anonymous participation.

4.1.7. Statistical Analysis

Data analysis was conducted using SPSS (version 23) and AMOS (Version 23). Descriptive statistics and the internal consistency of the used measures were performed using SPSS. The independent-sample t-test and one-way ANOVA were used to assess significant differences in the participants' scores of BO, QOL, and NPPAEs based on their demographic and work-related characteristics. Multiple regression analyses were used to predict the scores of BO, QOL, and NPPAEs based on demographic and work-related characteristics. Additionally, while controlling the hospital type and common work-shift, the partial correlation test, was used for comparison with the results of basic correlation. To compare the environment of the MOH and the University-Affiliated hospitals, the *T-test* was used to compare nurses' QOL. The *Mann-Whitney* test was used to compare the nurses working on day shifts and night/ alternate shifts in terms of BO and perceived health status.

AMOS was used to perform the structural equation modelling (SEM) analyses. The SEM analyses were conducted through performing two main steps; the pooled confirmatory factor analysis (CFA) followed by examining the structural model. During both steps, the goodness of model fit indices were set a priori to make the decision whether a model should be modified or retained. These indices were set as follows: a) absolute fit: Root Mean Square of Error Approximation (RMSEA) < .07, b) incremental fit: Comparative Fit Index (CFI) > .95, and c) parsimonious fit: Chi Square/Degrees of Freedom (Chisq/df) < 5 (Hair et al., 2010).

In the first step, the pooled CFA was performed to examine the validity of the measurement model. The four main constructs of the study (work-related variables, QOL, AE, and BO) were entered into the model and examined simultaneously. The main advantage of conducting pooled CFA is the ability to evaluate the validity of these four main constructs at once.

Based on the results, modifications to the measurement model were made, using the item-deletion process. Such modifications were made to enhance the validity of the model. For example, 10 variables were initially used as indicators of the work-related factor. Considering the poor goodness of model fit indices and low factor loadings of some variables, the measurement model was modified by deleting five of these variables (see the Results section).

In the second step, the structural model was examined using the same goodness of model fit indices. In addition, the factor loadings and the standardized regression weights were evaluated. Different versions of the structural model were compared to figure out which version best fits the data. The first version was created to examine whether the work-related factor effect on nurses' BO is mediated by both QOL and AE (serial mediation). On the other hand, the second version of the model examined whether a separate mediation effect of QOL and AE exists. The goodness of model fit indices of these versions were evaluated and compared based on the cut-off values set a priori. The version of the model with values meeting the cut-off values set a priori was then retained.

4.2. Results

4.2.1. Descriptive analysis of the demographic and work-related characteristics of the participants

The mean age of the study participants was 33.6 (Standard Deviation [SD] = 6.5) years, while the mean number of children was 2.3 (SD = 1.8), and the mean BMI was 25.8 (SD= 4.1). The average number of hours worked per week was 41.9 (SD = 5.35). The majority of the participants were female (94.2%), married (82.7%), and bachelor's degree holders (87.6%). Most participants (72.2%) perceived their salaries as insufficient to cover their expenses. (Table 3)

4.2.2. Descriptive analysis of BO, QOL, and NPPAEs Outcome Scores

The mean of the total CBI scores was 67.36 (SD = 17.43), indicating high levels of BO among study participants. The highest score among the subscales was for personal BO (73.8, SD = 20.9), followed by work-related BO (66.1, SD = 18.6), and then client-related BO (62.5, SD = 21.5). The overall QOL rating was 45 (SD = 14.2). The lowest scores on the four domains of the WHOQOL-BREF were the physical health (43.0, SD = 14.0) and environment domains (44.4, SD = 16.0). The frequency of nosocomial infections was rated higher than other types of NPPAEs. (Table 4)

Table 3: Participants characteristics (N=225)

Variable	<u>N</u>	<u>Percentage</u>
Gender		
Male	11	4.9
Female	212	94.2
Marital status		
Single	34	15.1
Married	186	82.7
Divorced /Widowed	5	2.2
Education		
2-year college	5	2.2
Bachelor's degree	197	87.6
Master's degree	23	10.2
Hospital		
Governmental	158	70.2
University-affiliated	67	29.8
Intent to leave		
Yes	108	48.0
No	116	51.6
Missing	1	.40
Usual work shift		
Day	86	38.2
Night	36	16.0
Alternate	100	44.4
Perception regarding monthly salary		
Enough	62	27.6
Not enough	161	71.6
	<u>Mean</u>	<u>SD</u>
Weekly work hours	41.9	5.36
Experience (years)	11.1	6.74
Age (years)	33.6	6.5

Table 4. Description of BO, QOL, and NPPAEs Outcome Scores (N=225)

Measure	Minimum	Maximum	M (SD)
Total BO score	17.11	98.68	67.36 (17.43)
Personal BO	16.67	100.0	73.77 (20.88)
Work-related BO	17.86	100.0	66.05 (18.60)
Client-related BO	0	100.0	62.50 (21.54)
Overall QOL	12.5	83.0	45 (14.2)
Physical health	6.0	81.0	43.0 (14.0)
Psychological health	6.0	88.0	47.71 (16.14)
Social relationships	0	94.0	45.14 (20.64)
Environment	0	82.0	44.4 (16.0)
NPPAEs	1.0	5.50	1.75 (.85)
Medication errors	1	6	1.65(1.1)
Pressure ulcer	1	6	1.62(.98)
Falls	1	5	1.6(.91)
Nosocomial infection	1	6	2.14(1.2)

4.2.3. Differences between nurses' scores on BO, QOL, and NPPAEs based on the demographic and work-related characteristics.

T-test analyses showed that there were significant differences between male and female BO scores ($t_{221} = 2.39, p = 0.018$) and overall QOL rating ($t_{221} = -2.86, p = 0.005$). In this study, females reported higher BO (68.2) scores than males (53.0) and a lower rating of overall QOL (2.92) than males (3.6). Further analyses of the CBI subscale scores showed that females scored significantly higher on personal and work-related BO than males. In addition, nurses who smoked reported a significantly ($t_{223} = 2.66, p = 0.008$) lower rating (2.46) of their overall QOL than non-smokers (3.01). The analysis further revealed that nurses who perceived their salaries as insufficient had significantly ($t_{221} = 2.07, p = 0.040$) higher BO scores and lower overall QOL ($t_{221} = 2.84, p = 0.005$) ratings than their counterparts who perceived their salaries sufficient. None of the differences in NPPAEs' scores were significant among pediatric nurses in this study. (Table 5)

The results showed that there were small-to-moderate but, nevertheless, significant correlations between nurses' age and their personal BO ($r = -0.19, p < 0.010$) and total BO ($r = -0.14, p < 0.050$) scores (Table 6). In addition, unit capacity correlated significantly with the social relations domain ($r = -0.15, p < 0.050$) and total BO scores ($r = 0.13, p < 0.050$). The results also showed that the overall QOL rating had a significant negative correlation with the total BO score. None of the demographic or work-related characteristics significantly correlated with the NPPAEs' scores. However, there was a significant negative correlation between the overall QOL rating and the total NPPAEs' scores. (Table 6)

Table 5. Outcome Variables' Differences Among Participants Based on Their Demographic and Work-Related Characteristics (N =225) a

Variable	Characteristics	n (%)	Total BO Scores		Overall QOL		NPPAEs	
			M (SE)	F/t	M (SE)	F/t	M (SE)	F/t
Gender	Male	11 (4.9)	53.0 (4.55)	2.39*	3.6 (.20)	-2.86**	1.8 (.23)	.34
	Female	212 (95.1)	68.2 (1.18)		2.92 (.07)		1.7 (.06)	
Marital Status	Single/unmarried	39 (17.3)	66.0 (2.72)	.61	3.0(.15)	.34	1.84 (.14)	.70
	Married	186 (82.7)	67.6 (1.28)		2.94(.07)		1.74 (.06)	
Education	Diploma	5 (2.2)	70.0 (5.76)	.10	2.60 (.25)	.55	2.25 (.38)	1.84
	Bachelor	197 (87.6)	67.2 (1.23)		2.94 (.07)		1.76 (.06)	
	Master	23 (10.2)	68.25 (4.29)		3.09 (.18)		1.51 (.16)	
Hospital	University	67 (29.8)	67.5(1.40)	.76	2.88 (.08)	1.70	1.75 (.06)	.005
	Governmental	158 (70.2)	67.0(2.09)		3.12 (.11)		1.75 (.11)	
Unit	General Pediatric	87 (39.2)	68.8(1.87)	.93	2.89 (.10)	-.86	1.71(.09)	-.31
	Critical Care	135 (60.8)	66.6(1.51)		3.0 (.08)		1,74 (.07)	
Smoking	Non-smoker	201 (89.3)	66.7 (1.2)	-1.61	3.01(.07)	2.66**	1.73 (.06)	-.74
	Smoker	24 (10.7)	77.8 (3.8)		2.46 (.24)		1.88 (.19)	
Salary Perception	Enough	62(27.8)	63.25(2.38)	-2.07*	3.26 (.13)	2.84**	1.6 (.11)	-1.7
	Not enough	161 (72.2)	68.6 (1.30)		2.86 (.07)		1.82 (.07)	

Note: N: number, M: mean, SE: standard error, F: One- Way ANOVA test value, t: t-test value; a: number of participants varied across variables
* $p < .05$, ** $p < .01$

Table 6. Correlations Among Study Variables (N= 225)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Age	1	.62**	.27**	-.27**	-.06	.09	.02	-.19**	-.09	-.07	-.02	.01	.04	-.01	-.14*	-.11
(2) Number of children		1	.17*	-.28**	-.09	.03	.02	-.07	-.02	.01	-.07	-.03	.01	-.07	-.03	-.10
(3) BMI			1	-.06	.02	.04	-.03	.07	.09	.09	-.10	-.06	-.01	.04	.10	.10
(4) Hospital Capacity				1	.69**	.13	-.05	.09	-.04	-.10	.10	.12	.02	.20**	-.02	.12
(5) Unit capacity					1	.17*	-.22**	.22**	.07	.04	-.02	-.11	-.15*	-.04	.13*	.08
(6) Weekly Working Hours						1	-.05	-.04	-.02	-.04	.10	.07	.03	.09	-.04	.04
(7) Overall QOL							1	-.44**	-.36**	-.50**	.33**	.50**	.40**	.49**	-.50**	-.14*
(8) Personal BO								1	.62**	.54**	-.50**	-.49**	-.37**	-.40**	.83**	-.01
(9) Work-Related BO									1	.67**	-.57**	-.46**	-.26**	-.49**	.89**	-.06
(10) Client-Related BO										1	-.48**	-.55**	-.30**	-.50**	.86**	-.04
(11) Physical Health											1	.59**	.47**	.60**	-.60**	.07
(12) Psychological Health												1	.60**	.75**	-.58**	-.09
(13) Social Relations													1	.68**	-.36**	-.09
(14) Environment														1	-.54**	-.01
(15) BO Total Score															1	-.05
(16) NPPAEs																1

* $p < .05$, ** $p < .01$

4.2.4. Regression Analysis

Multiple regression analyses were run to find the model that would predict participants' overall QOL, BO, and NPPAEs. The predictors in the three models were a group of demographic and work-related characteristics. Taken all together, these variables significantly predicted overall QOL ($F(13, 180) = 2.97, p = 0.001, R^2_{Adjusted} = 0.12$), BO ($F(13, 180) = 3.0, p < 0.0001, R^2_{Adjusted} = 0.12$), and NPPAEs ($F(13, 180) = 1.81, p = 0.040, R^2_{Adjusted} = 0.05$). For the model predicting overall QOL, the significant predictors were unit capacity ($\beta = -0.28, p < 0.010$) and perceived sufficiency of salary ($\beta = -0.28, p < 0.001$). For the BO model, the significant predictors were age ($\beta = -25, p < 0.010$), hospital capacity ($\beta = -32, p < 0.010$), unit capacity ($\beta = 0.30, p < 0.010$), and perceived sufficiency of salary ($\beta = 0.19, p < 0.010$). Furthermore, the only significant predictor of NPPAEs' scores was the perceived sufficiency of salary ($\beta = 0.19, p < 0.050$). (Table 7)

Table 7. Regression Results for Overall QOL, BO, and NPPAEs (N = 225)

Dependent Variable	Overall QOL		BO		NPPAEs	
Model Summary	<i>F</i> (13, 180) = 2.97, <i>p</i> = .001, <i>R</i> ² _{Adjusted} = 0.12		<i>F</i> (13, 180) = 3.0, <i>p</i> < .0001, <i>R</i> ² _{Adjusted} = 0.12		<i>F</i> (13, 180) = 1.81, <i>p</i> = 0.04, <i>R</i> ² _{Adjusted} = 0.05	
Predictors	<i>β</i>	<i>t</i>	<i>β</i>	<i>t</i>	<i>β</i>	<i>t</i>
Constant		3.50***		1.24		2.57*
Age	.048	.50	-.25	-2.66**	-.17	-1.75
Sex	-.13	-1.94	.10	1.56	-.01	-.16
Marital status	.01	.17	-.05	-.68	-.07	-.80
Number of children	.05	.49	.05	.55	.02	.26
Body Mass Index	-.02	-.30	.12	1.67	.14	1.92
Level of education	-.02	-.31	.09	1.34	-.17	-2.26
Smoking	-.11	-1.57	.12	1.73	-.08	-1.22
Type of hospital	.01	.04	-.07	-.82	-.03	-.37
Unit / Ward	.01	.15	-.06	-.79	.02	.26
Hospital Capacity	.21	1.96	-.32	-3.01**	.12	1.14
Unit capacity	-.28	-2.74**	.30	2.99**	-.09	-.91
Monthly salary perception	-.28	-3.84***	.19	2.62**	.19	2.53*
Working hours per week	.02	.35	-.05	-.79	-.02	-.34
* <i>p</i> < .05, ** <i>p</i> < .01, *** <i>p</i> < .001						

4.2.5. CFA

A pooled CFA was performed on different versions of the model. Initially, the construct work-related factor was identified using ten variables. These variables were the hospital type (governmental or university-affiliated), job satisfaction, intent to leave, usual work shift, weekly work hours, manager support, co-worker support, participation in continuous education, satisfaction with the monthly salary, and exposure to violence. This model did not meet the goodness of model fit indices set a priori, and the factor loadings of some items of the work-related construct were below 0.30. Factor loadings of the items reflective of the constructs: adverse events, QOL, and BO were acceptable (> 0.30). Thus, the model was adjusted by modifying the determinants of the work-related construct. The variables with the lowest factor loadings were removed from the model: type of hospital, usual work shift, and weekly work hours. The standardized factor loadings for these variables were 0.11, 0.08, and 0.03, respectively. After deleting these three variables, the model fit indices improved, but they were still not satisfactory (Table 8). Another two variables were removed based on the same rationale followed in the previous step, namely: manager support and intent to leave. This model achieved the goodness of model fit indices criteria (Table 8), and the model is depicted in Figure 6.

Table 8. Pooled CFA and SEM models

Pooled CFA models				
<u>Model</u>	<u>Chi Square</u>	<u>CFI</u>	<u>RMSEA</u>	<u>Chisq/df</u>
Model 1	$X^2 = 372.74, df = 183, p < .001$	.872	.068	2.04
Model 2	$X^2 = 242.87, df = 129, p < .001$	.919	.063	1.88
Model 3	$X^2 = 161.62, df = 98, p < .001$	.951	.054	1.65
SEM models				
<u>Model</u>	<u>Chi Square</u>	<u>CFI</u>	<u>RMSEA</u>	<u>Chisq/df</u>
Model 1 (Serial mediation)	$X^2 = 195.18, df = 99, p < .001$	.925	.066	1.97
Model 2 (Separate mediation)	$X^2 = 161.62, df = 98, p < .001$	.951	.063	1.65

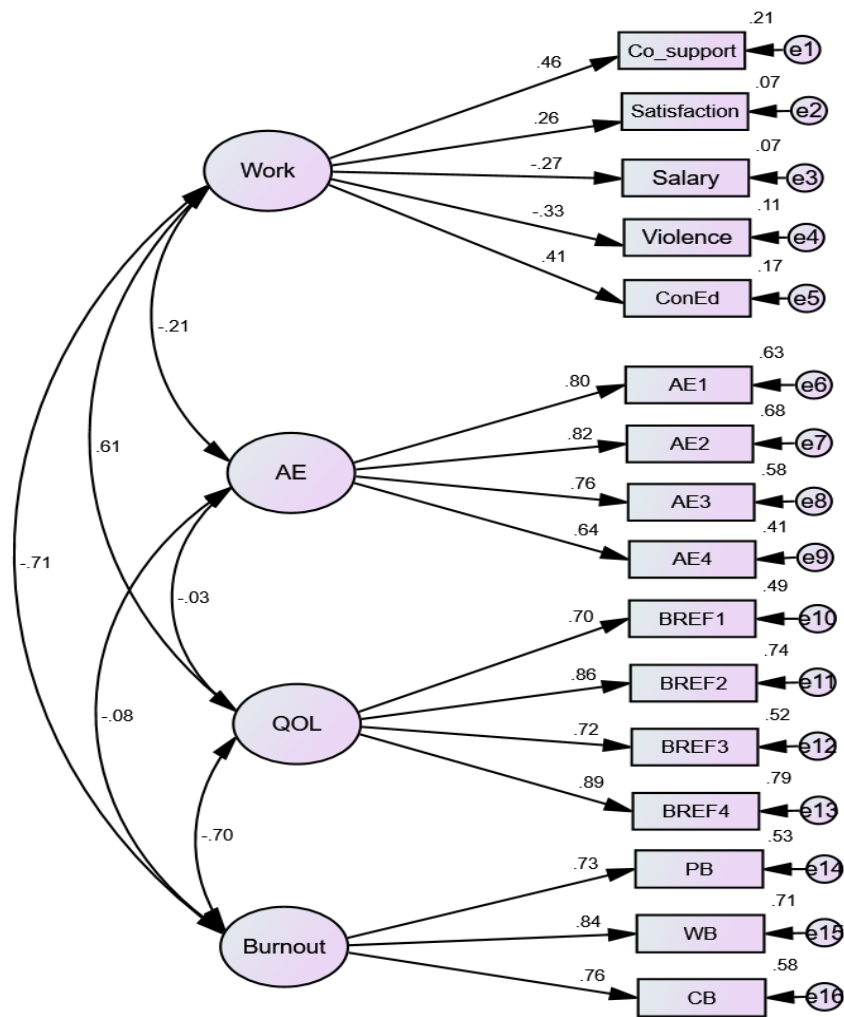


Figure 6. Pooled CFA

4.2.6. SEM Model

In the SEM model, two versions were also compared. The first model examined the effect of work-related construct on BO with serial mediation of QOL and adverse events. The second model examined the effect on BO through the separate mediation paths of QOL and adverse events. The goodness of model fit indices of the second model were better: CFI = 0.951, RMSEA = 0.063, and Chisq/df = 1.65 (Table 8).

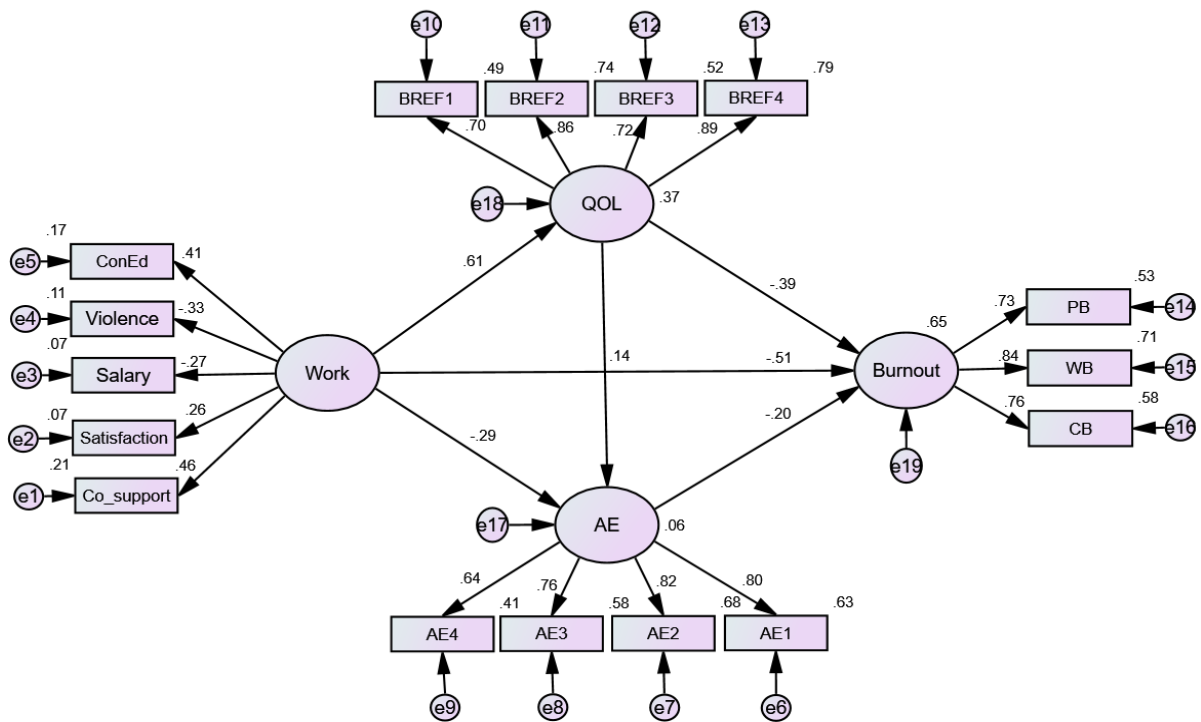


Figure 7. Final SEM model

The final SEM model is shown in Figure 7. The results showed that the effect of the work-related construct on BO construct is statistically significant ($\beta = -0.51, p = 0.009$). This effect means that one standard deviation increase in the work-related construct leads to a 0.51 reduction in BO. The impact of the work-related construct was significant on QOL but not on the adverse event. The mediators, QOL and adverse events, effects on BO were statistically significant (Table 9). The standardized regression weights, p values, standard errors, and critical ratios are all presented in Table 9. The R^2 value of the BO construct in the final model was 0.65. That means that 65% of BO variance is explained by the model and the presented paths.

Table 9. Standardized regression weights (β), p values, standard errors, and critical ratios

Path	β	<u>p value</u>	<u>SE</u>	<u>CR</u>
Work-related \rightarrow BO	-.51	.009	6.51	-2.60
Work-related \rightarrow QOL	.61	< .001	.97	3.69
Work-related \rightarrow Adverse events	-.29	.10	.33	-1.64
QOL \rightarrow Adverse events	.14	.29	.04	1.07
QOL \rightarrow BO	-.39	.003	.75	-2.93
Adverse events \rightarrow BO	-.20	.011	1.43	-2.53

4.2.7. The moderating role of hospital type in the relationship between QOL and ITL

The Spearman correlation results demonstrated that ITL and QOL scores are significantly and negatively correlated ($r = - 0.227, p < 0.01$). Another significant correlation was also found between QOL scores and type of hospital ($r = - 0.204, p < 0.01$). (Table 10)

Controlling the type of hospital, the correlation was also significant between intent to leave and QOL ($r = - 0.208, p = 0.001$); however, the initial correlation changed from $- 0.227$ to $- 0.208$ showing a moderating effect of hospital type.

The *independent-samples T-test* showed that the pediatric nurses' QOL score is statistically different between the MOH and the University-Affiliated hospitals ($t = 2.81, P = 0.005$). In university-affiliated, the mean QOL score was 49.0 (SD = 11.6) compared to 43.2 (SD =14.9) in the MOH hospitals.

In order to find the significant variables predicting pediatric nurses' ITL, binary logistic regression was done. Seven work-related variables were loaded into the model predicting ITL and the goodness-of-fit test Hosmer & Lemeshow test was: $X^2 = 18.55, p = 0.017$. Within the significant model predicting ITL, only two variables (the monthly salary perception and the nursing care model) were significantly predicting pediatric nurses' ITL. Exposure to violence, the time available for family, number of patients assigned for, weekly work hours, and break time per shift were not significant predictors of ITL. (Table 11)

Table 10. Bivariate correlation (the relationship between QOL and ITL)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Age (1)	1.000									
Gender (2)	-.089	1.000								
Marital status (3)	.260**	-.022	1.000							
Level of education (4)	-.170**	.048	-.284**	1.000						
Type of hospital (5)	.400**	-.014	.086	-.187**	1.000					
Common work shift (6)	-.567**	-.005	-.178**	.082	-.231**	1.000				
Work hours per week (7)	.145*	-.046	-.013	.015	.146*	-.255**	1.000			
Experience in years (8)	.906**	-.040	.226**	-.115*	.389**	-.553**	.198**	1.000		
Intention to leave (9)	-.127*	.096	-.057	.109	.084	-.031	-.008	-.102	1.000	
Average QOL (10)	-.012	-.215**	-.078	.066	-.204**	-.031	.039	-.042	-.227**	1.000
* $p < .05$, ** $p < .01$										

Table 11. The binary logistic regression – Intent to leave (dependent variable), salary, nursing model, exposure to violence, family time, number of patients, working hours, and break time (covariates)

Hosmer & Lemeshow goodness-of-fit test: $X^2 = 18.55, p = 0.017$					
Covariates	β	Standard error	Wald	Significance	Odds ratio
Monthly salary perception	-1.065	.381	7.804	.005	.345
Nursing care model	-.468	.187	6.276	.012	.626
Exposure to violence	-.004	.003	2.064	.151	.996
Time available for family	-.434	.426	1.038	.308	.648
Number of patients assigned for	.006	.011	.360	.548	1.006
Working hours per week	.018	.029	.379	.538	1.018
Break time per shift	-.005	.008	.401	.526	.995

4.2.8. The moderating effect of the common work-shift on the relationship between BO and perceived health

The Spearman correlation results demonstrated that nurses' BO and the perceived health status are negatively correlated ($r = - 0.343, p < 0.01$). Also, a significant correlation was found between nurses' BO scores and common work-shift ($r = 0.157, p < 0.01$). Furthermore, the common work-shift was also found negatively correlated with nurses' perceived health status ($r = - 0.226, p < 0.01$). See *Table 12*.

Table 12. Bivariate correlation (the relationship between BO and perceived health)

	BO	The perceived health status	The common work shift
BO	1.000		
The perceived health status	-.343*	1.000	
The common work shift	.157*	-.226*	1.000
* $p < .01$			

Controlling the common work-shift, the correlation was also significant between BO and the perceived health status ($r = - 0.314, p > 0.001$). However, the initial correlation changed from - 0.343 to - 0.314 showing a moderating effect of the common work-shift. To compare the levels of BO and their perceived health status between nurses working on day shift and those working on night/alternate shift, we used the *Mann-Whitney* test. The results showed significant differences in the two variables, nurses' BO and their perceived health status. See *Table 13*.

Table 13. The Mann-Whitney test

	Mean rank (Day shift)	Mean rank (Night/Alternate shifts)	Z-score
BO score	99.5	120.5	-2.4*
The perceived health	129.8	101.9	-3.4**
* $p < .05$, ** $p < .01$			

4.3. Discussion

4.3.1. Scores of BO, QOL, and NPPAEs based on the demographic and work-related characteristics.

This study aimed to measure Jordanian pediatric nurses BO, QOL, and perceived patient adverse events scores and the associations between the studied variables. High levels of BO were found among the Jordanian pediatric nurses who participated in this study, as revealed by scores of the three CBI subscales of 73.77, 66.05, and 62.5. These scores are much higher than the scores in the PUMA study, which were 36.9, 35.0, and 29.7 (Kristensen et al., 2005). The higher BO scores among pediatric 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 BO scores is also consistent with the results of a previous study in Jordan (Mudallal et al., 2017). In terms of QOL, pediatric nurses in Jordan scored relatively low, as shown by the WHOQOL-BREF scores. The low scores in the WHOQOL-BREF domains might be secondary to the high BO among pediatric nurses who participated in this study. The pediatric nurses' lowest scores, which were in the physical health and environmental domains, could be related to the high workload, as reflected by the relatively high unit capacity (mean=28.4). As perceived by pediatric nurses, nosocomial infections were the most frequent among four types of perceived patient adverse events. This could be related to the low immunity of pediatric patients, the lack of healthcare workers' (HCW) awareness of infection control guidelines, and the low compliance of healthcare workers with infection control practices (Hammoud et al., 2017). In the case of this study, most of the respondents work with critically ill pediatric patients in the ICU.

Another aim of the study was to assess the relationships between demographic and work-related characteristics and BO, QOL, and perceived patient adverse events among Jordanian pediatric nurses during the COVID-19 pandemic. Female nurses in this study showed higher BO and lower QOL scores than male nurses, which is congruent with one previous study (Azizkhani et al., 2014). However, another study found no differences between female and male nurses in terms of BO. Gender differences should be further explored to identify the factors that are contributing to pediatric nurses' BO (Gandi et al., 2011).

In this study, nurses who perceived their salaries to be insufficient had a higher BO score and a lower QOL score than their counterparts; the stress caused by an inability to cover living expenses with one's job may explain this finding. One study found that nurses who perceive their salaries to be lower than their workloads experience high levels of BO (Rezaei et al., 2018); this requires a re-evaluation of pediatric nurses' salaries in Jordan to balance salaries

and workloads. Smokers reported lower QOL than non-smokers; both the financial and health complications of smoking are possible explanations for why smoker respondents demonstrated lower QOL scores than non-smokers. Another study found that nurses who smoke consistently report lower health-related QOL (Sarna et al., 2008). Further assessment of QOL among nurses who smoke is warranted (Sarna et al., 2008).

Nurses' age negatively correlated with their BO scores; however, unit capacity positively correlated with their BO scores. These results were compatible with a previous study which 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 BO scores (J. Wang et al., 2020). Higher unit capacity is associated with higher workloads. This could explain the increased BO scores among pediatric nurses. Older nurses who are more experienced reported lower BO 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 scores negatively correlated with both BO and NPPAEs during the COVID-19 pandemic. In other words, higher BO 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 BO scores were associated with patient safety (de Lima Garcia et al., 2019). In addition, another study 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 BO and patient adverse events.

Multiple regression results revealed that the perceived sufficiency of salary was a significant predictor of BO, QOL, and NPPAEs. The results showed that pediatric nurses who had a lower perception of their salaries tend to have higher BO and lower QOL scores and report more adverse events related to their patients. Improving work environments and increasing wages to alleviate stress and related BO associated with nursing jobs could help to address these results (Holdren et al., 2015). Based on the results of this study, Jordanian healthcare decision-makers and stakeholders should ensure that pediatric nurses' wages match their workloads.

4.3.2. SEM Model

Another aim of this study was to assess the extent to which integrating the CS-CF and empowerment models can explain the relationships between pediatric nurses' BO, QOL, perceived patient safety, and work-related variables during the COVID-19 pandemic. According to the hypothesized CS-CF-empowerment integrated model, the work-related variables impact BO both directly and indirectly. The indirect impact is hypothesized to occur through QOL and the four types of adverse events studied namely: medication errors, nosocomial infection, patient falls, and pressure ulcers. The results of the current study partially supported this model. The results of this study supported the direct relationship between some of the work-related variables (co-workers' support, job satisfaction, satisfaction with the monthly salary, participation in continuous education, and exposure to violence) and BO. Also, the results showed that QOL is a mediator in this relationship between work-related variables and BO. However, the data failed to demonstrate that the adverse events construct was a significant mediator in the relationship of work-related variables and BO. Surprisingly, adverse events were negatively related to pediatric nurses' BO scores. The lower BO scores were associated with the higher frequencies of perceived adverse events. This finding might be explained that nurses with lower BO scores have better work-related variables (such as co-workers support and blame-free environment) finally are more able to report the adverse events such as medication errors. In other words, nurses with higher BO scores might be afraid from reporting the adverse events.

Based on this model, it can be assumed that better work-related variables predict better QOL scores, which in turn predict lower BO scores. The literature demonstrated that work-related variables have positive relationships with QOL. For example, one study found that a better quality of working life was positively related to a better QOL (Moradi et al., 2014). This means that a better work environment or work-related variables are correlated with better QOL among nurses (Moradi et al., 2014). Additionally, work-related variables were found to be determinantal in improving nurses' QOL (Ibrahim et al., 2016). Also, it was found that nurses with longer experiences and higher payments reported better QOL (Dos Santos et al., 2018). However, those nurses working in closed special units and working more than 36 hours per week reported lower QOL scores (Dos Santos et al., 2018).

In the current study, the variables that contributed positively to the work-related construct were co-workers' support, job satisfaction, and continuous education. On the other hand, work-related violence and perception of salary were negatively contributed to the work-related construct. This indicated that support from co-workers, higher satisfaction scores, and more

involvement in continuous education activities would positively affect nurses' QOL. In contrast, a lower perception of salary and a higher violence rate at workplace will affect QOL negatively. This finding matches the previous studies. For instance, co-worker support was found to be a significant predictor of QOL in all domains (Kowitlawkul et al., 2019). Additionally, nurses' job satisfaction was positively correlated with higher QOL scores (Ioannou et al., 2015). Uniquely, continuous education was positively correlated with the work-related construct in this study. In other words, improving nurses' knowledge at their work could lead to a better work environment perception. This finding can be explained as improved knowledge might reduce the stress associated with complicated and ambiguous work-related tasks.

A previous study showed that workplace violence was negatively associated with nurses' perception of the work environment, which affects their QOL (J. Y. Zeng et al., 2013). Furthermore, QOL mediated the relationship between workplace violence and nurses' job performance (W. Q. Lin et al., 2015). Consequently, patient safety might be directly affected by nurses' performance at work (Ammouri et al., 2015). In this study, patient safety was reflected by the adverse events construct. The relationship between QOL and adverse events was insignificant. On the other hand, QOL was negatively and significantly associated with nurses' BO in this study. The negative correlation between QOL and BO is well established in the literature (Abraham & D'Silva, 2013; Fradelos et al., 2014; Naz et al., 2016).

In this study, the negative relationships between BO and both QOL and work-related variables are justified earlier. This finding is congruent with one study that nurses' BO, during COVID-19 pandemic, and their QOL are correlated (An et al., 2020). However, BO's negative relationship with adverse events construct seems to be problematic. This relationship indicated that with increased perception of adverse events, nurses reported lower BO, and the vice versa is true. This result was not congruent with previous studies (Nantsupawat et al., 2016; Van Bogaert et al., 2014), in which the increased adverse events were associated with increased nurses' BO. Also, this finding is not congruent with another study which found that nurses' lower BO and higher personal accomplishment, during COVID-19 pandemic, is correlated with less frequent medication errors (Kakemam et al., 2021). This unexpected result could be explained by the fact that reporting adverse events was impeded by nurses' fear of losing their licenses, low confidence in reporting adverse events, fear of blame, and patient complaints (Moumtzoglou, 2010). Thus, it is recommended for future studies to assess adverse events by reviewing intuitions' records of incidents reports.

A recent study measured the adverse events objectively by reviewing the incidents database and found that adverse events were positively associated with BO (Vogus et al., 2020). In the same study, it was also found that safety climate and workgroup identification moderated the relationship between adverse events and BO (Vogus et al., 2020). In other words, low workgroup identification group and lower safety climate were associated with higher adverse events (Vogus et al., 2020). Workgroup identification and safety climate were not assessed in the current study; However, they are relevant to our study. The workgroup identification is the degree to which an employee is mentally connected to the workgroup. The workgroup identification is relevant to our study as it is similar to co-worker's support. Also, safety climate is the degree to which a workgroup cares about safety. Safety climate is also relevant to our study as we assessed multiple dimensions of safety threats, nurses' exposure to violence and patient adverse events (medication errors, nosocomial infection, patient falls, and pressure ulcers).

Because of the poor goodness of model fit indices and low factor loadings of some variables, the measurement model was modified by deleting five of the work-related variables (type of hospital, usual work shift, weekly work hours, manager support, and intent to leave). Interestingly, these findings are different from previous studies. For example, a previous study found that leaders empowering behaviours are related to lower nurses' BO (Mudallal et al., 2017). Empowering behaviours is not studied in our study; however, it is a type of manager support. Also, manager support was negatively related to adverse patient events, BO, and intent to leave (H. Khatatbeh, Al-Dwaikat, et al., 2021; H. Khatatbeh, Pakai, Pusztai, et al., 2020). The reasons behind this incongruency might include the different pediatric nursing environments from the adult nursing environment and loading all of these work-related variables in our study as a construct not separately.

4.3.3. The moderating role of hospital type in the relationship between QOL and ITL

This study aimed to assess the relationship between pediatric nurses' QOL and ITL. The results of this study support the negative correlation between QOL and their ITL nursing jobs. Nurses with better QOL will show less ITL their nursing jobs and vice versa. This finding matches a previous study, which found that a better mental QOL decreases nurses' ITL (Perry et al., 2017). This study is also congruent with a Norwegian study which found that ITL is associated with poor satisfaction about nursing work-life (Andresen et al., 2017).

According to the hypothesized conceptual model, this study aimed to examine the moderating effect of hospital type on the relationship between nurses' QOL and ITL. The results showed a moderating effect of hospital type on the relationship between nurses' QOL and ITL.

This finding is supported by a previous study that established a relationship between the type of healthcare institution and nurses' ITL (Yamaguchi et al., 2016). The moderating effect of hospital type on the relationship between nurses' QOL and ITL can be explained by the distinct strategies and policies for each type of hospital (Al Sabei et al., 2020). The diverse strategies and policies will definitely alter the work environment (Al Sabei et al., 2020; Dos Santos et al., 2018) and affect the working QOL for all employees, including pediatric nurses. Subsequently, QOL will finally affect nurses' satisfaction and ITL (Andresen et al., 2017). Also, the different management style across the different hospitals encompasses various levels of nurses' empowerment that finally affect their satisfaction and ITL (Yamaguchi et al., 2016).

Another aim of this study was to compare QOL of pediatric nurses' working at the MOH and the University-Affiliated hospitals. The results also showed that pediatric nurses' QOL scores were significantly higher in the University-Affiliated hospital than in the MOH hospitals. This finding matches what was found in a previous study that the type of hospital and nurses' QOL are correlated (Moradi et al., 2014). On the other hand, this result might conflict with a previous study, which found that nurses working at the University-Affiliated hospitals have higher stress than those working at the MOH hospitals (Amarneh, 2017). The reason behind the higher stress in the University-Affiliated hospitals in the study of Amarneh (2017) can be explained by the stricter policies applied in the University-Affiliated hospitals compared to the MOH hospitals. This finding is supported by another study that found a significant association between nurses' QOL and work environment such as autonomy and organizational support (Dos Santos et al., 2018).

Another aim of this study was to explore the determinants of pediatric nurses' ITL. Those variables which significantly predicted pediatric nurses' ITL were the monthly salary perception and the nursing care model. Pediatric nurses who think they are getting enough salaries will not have ITL. This finding was congruent with a previous study that found that salary affects nurses' ITL (Alhamwan et al., 2015). Also, the total nursing care model was preferred over the team or functional nursing model. Pediatric nurses in Jordan prefer total patient care over working in teams. Together, these two variables and other variables, which need to be further studied, contribute to the nurses' work environment and make them either want to leave or stay. This finding in addition to the different QOL at the MOH and the University-Affiliated hospitals indicates that the nurses' work environment might be different in the two types of hospitals in Jordan. That is, the varying work environment and policies might

explain the significant differences found in pediatric nurses' QOL between the MOH and the University-Affiliated hospitals.

4.3.4. The moderating effect of the common work-shift on the relationship between BO and perceived health

Additional aim of this study was to explore the relationship between pediatric nurses' BO, perceived health, and common work-shift. The results showed three significant correlations between the studied variables. First, the perceived health was negatively correlated with pediatric nurses' BO. In other words, the higher BO scores are associated with poorer health perception, which matches a previous study (S. H. Lin et al., 2014). Second, the perceived health was negatively correlated with common work-shift. This finding means that the poorer health perception is accompanying the night/ alternate shifts, which matches previous studies (Ferri et al., 2016; Jensen et al., 2018). Our finding is also congruent with a previous study which found that nurse's illness is associated with a higher night-to-day shift ratio (Dall'Ora et al., 2020). Last, nurses' BO was positively correlated with their common work-shift. In other words, the higher BO scores are linked with night/ alternate shifts, which is supported in previous studies (Dehring et al., 2018; Ferri et al., 2016). Our result is also consistent with a previous literature review which concluded that job satisfaction is diminished with permanent night shifts (Dall'Ora et al., 2016).

Another aim of this study was to examine the moderating effect of shift type on the relationship between pediatric nurses' BO and perceived health. The differences between basic and partial correlation suggest a moderating effect for the shift type on the relationship between BO and perceived health. This finding can be explained in two steps. First, nurses BO is known to affect their health which matches the previous studies (Fradelos et al., 2014; H. Khatatbeh, Pakai, Pusztai, et al., 2020; S. H. Lin et al., 2014). Second, the effect of night/ rotating shift on nurses' perceived health. This result is also compatible with earlier studies (Ferri et al., 2016; Jensen et al., 2018). In other words, night/ rotating shifts can exaggerate the impact of BO on pediatric nurses' perceived health.

The last aim was to compare BO and perceived health between pediatric nurses working on day shifts and those working on night/ alternate shifts. Results showed that nurses' BO is significantly different in nurses working on day shifts from those working on night/alternate shifts. Nurses working on night/alternate shifts showed higher BO scores than those working on day shifts. This finding is partially supported by a previous study, which found that job satisfaction

is significantly lower among nurses working on shifts (Tahghighi et al., 2019). Results also showed a significant difference in nurses' perceived health between nurses working on day shifts and those working on night/alternate shifts. In other words, nurses working on night/alternate shifts have poorer health than those working on day shifts. This result is well-matched with a previous study, which found that sleep difficulties, tiredness, and cardiac symptoms are more common among nurses working on night shifts (Ferri et al., 2016).

4.4. Limitations

The authors recognize that the final sample was more convenient rather than randomly selected, which may have had an impact on statistical conclusions and the generalization of the findings. Measuring patient adverse events from the perspective of pediatric nurses might also be another issue. Thus, we recommend assessing patient safety issues objectively by reviewing patients' charts and hospital incident reports. Furthermore, assessing general QOL could be another limitation. Thus, we recommend assessing professional QOL to capture the aspects of nurses' QOL that are directly attributable to their work.

The current study showed that work-related variables, directly and indirectly, affect nurses' BO. However, causation cannot be presumed because of the correlational nature of the study. Nevertheless, the structural equation modelling allowed the researchers to test their hypotheses regarding the relationships between work-related variables and BO during COVID-19 pandemic. Besides, the generalizability of the findings to all nurses is limited since these findings are pertinent to pediatric nurses. However, this could be an initiator to test this study's hypotheses with other groups of nurses. In addition, including other mediator variables such as work-related stress could improve our understanding of the relationship between work-related variables (such as patient to nurse ratio) and BO during COVID-19 pandemic. Furthermore, objective measurement of adverse events by reviewing institutional records of incidents report could improve the study. Since the data of this study was collected in the beginning of COVID-19 pandemic, a follow-up study is needed.

The convenient sampling technique and cross-sectional design used might limit the results' generalization. Assessing ITL using a single scale is an additional limitation. Also, the self-reported nature of the analyzed data is another limitation. Last, the study has been done in a specific socio-economic context which might not be generalizable to other contexts. However, the multi-site sample is a privilege.

The methodology of this study has some limitations including the convenient sample, cross-sectional design. Additionally, nurses' health and common work-shift were assessed by asking about perceptions. Our results would be strengthened if we have used a validated questionnaire in assessing nurses' health, and if we have accessed nurses' work schedule.

4.5. Conclusion

This study revealed that pediatric nurses in Jordan have high BO scores and low QOL, especially in the environmental and physical health domains. This study also demonstrated some differences in pediatric nurses' BO and QOL based on demographic and work-related characteristics. Factors that impact BO among pediatric nurses are age, hospital capacity, unit capacity, and perceived sufficiency of salary. Factors that predict lower QOL among pediatric nurses are unit capacity and perceived sufficiency of salary. The only factor that predicted more perceived patient adverse events among pediatric nurses is perceived sufficiency of salary. All of these factors should be taken into consideration as policymakers and decision-makers make the necessary interventions to decrease BO, improve QOL, and lower NPPAEs. The interventions needed include providing more co-worker support, especially for older pediatric nurses, increasing managerial support, reducing nurse-patient ratio, and increasing monthly salaries.

Using the CS-CF-Empowerment integrated model allows for assessing the different paths in the relationship between work-related variables and BO. In this study, the findings demonstrated that work-related variables directly associated with BO during COVID-19, and this relationship was mediated by QOL. According to the CS-CF-Empowerment integrated model, the work-related variables that should be targeted are co-workers' support, job satisfaction, satisfaction with the monthly salary, participation in continuous education, and exposure to violence. The CS-CF-Empowerment integrated model is suitable to guide future research about nurses' BO. So, a better understanding of nurses' BO can be achieved, and a better remedy can be accomplished. However, the data failed to show that adverse events could be a significant mediator in the relationship between work-related variables and BO. Thus, future studies are recommended to examine hospital records of incident reports to assess adverse events' mediating role.

The results showed that pediatric nurses' QOL is negatively correlated with ITL. Also, the hospital type, the MOH or the University-Affiliated hospitals, moderates the relationship

between pediatric nurses' QOL and ITL. Furthermore, pediatric nurses working at the University-Affiliated hospitals have better QOL than those working at the MOH hospitals. In response to the global nursing shortage and turnover, nurses' QOL improvement should be the target of the healthcare decision-makers. The managerial style and work environment of the MOH hospitals should be benchmarked against the University-Affiliated hospitals.

We recommend adopting the University-Affiliated hospitals' management style in governmental hospitals to improve pediatric nurses' QOL and decrease their ITL. Adopting the University-Affiliated hospitals' work environment in the MOH hospitals can improve the nurses' QOL and decrease their ITL. This would help in resolving the global nursing shortage (Burmeister et al., 2019) by improving nurses' QOL and reducing ITL. Nurse managers at the MOH hospitals are advised to adopt the nursing care model, the total patient care model, applied usually at the University-Affiliated hospitals. Salaries of pediatric nurses working at the MOH hospitals need to be reassessed and equalized with salaries of the University-Affiliated hospitals. To improve pediatric nurses' QOL, nursing executives should work on improving physical health, psychological health, social relationships, and work environment. The possible interventions might include applying vertical rotation by promoting the nurse to a higher hierarchical position. Another intervention is the horizontal rotation by assigning nurses to a new unit/ ward. Quality circle is a voluntary managerial technique in which the staff participates with their manager in a brainstorming activity to discover and solve work-related problems (Christman, 2003).

The results showed that pediatric nurses' BO is negatively correlated with their perceived health. It was found that the common work-shift is negatively correlated with nurses' perceived health, and positively with nurses' BO scores. Also, the common work-shift, day or night/alternate shifts, moderates the correlation between nurses' BO and their perceived health. Furthermore, pediatric nurses working usually on day shift have shown lower BO and better health than those working at night/alternate shifts. The exaggerated BO and poor health could finally lead to critical consequences, such as poor nursing services and nursing shortage.

It is impossible to assign all nurses on day shifts to reduce their BO. However, we advise nurse managers to critically observe and balance shift rotation, the night/ rotating shifts to day shifts ratio. Additionally, health policymakers should motivate and support pediatric nurses working usually on night/alternate shifts. Those nurses might be motivated through financial incentives or decreased weekly work hours. This could enhance nurses' health and lower BO scores.

5. Discussion of key findings

Our systematic review concluded that nurses are complaining of high levels of BO. The high levels of BO can be explained by several factors such as the challenging work conditions and working environments such as changing shifts, low nurse-to-patient ratio, and poor teamwork and collaboration with other healthcare workers (Erkorkmaz et al., 2018). Also, we concluded that nurses' BO impacts their QOL (Abraham & D'Silva, 2013; Alotni & Elgazzar, 2020; Aytekin et al., 2013; Fradelos et al., 2014; Hatamipour et al., 2017; Kelleci et al., 2011; H. Khatatbeh, Pakai, Pusztai, et al., 2020; Kupcewicz & Józwick, 2020; Ribeiro et al., 2021; L. N. Zeng et al., 2020). Although some studies included in the systematic review didn't find a significant correlation between nurses' BO and QOL, they found moderate to high levels of BO and relatively poor QOL (Kupcewicz & Józwick, 2020; Naz et al., 2016; Paniora et al., 2017; Permarupan et al., 2020; Wu et al., 2011).

The High levels of BO found in this study among Jordanian pediatric nurses, as revealed by scores of the three CBI subscales 73.77, 66.05, and 62.5, are much higher than the scores in the PUMA study 36.9, 35.0, and 29.7, respectively (Kristensen et al., 2005). Regarding the Jordanian pediatric nurses QOL, the lowest scores on physical health and environmental domains. In terms of NPPAEs, Nosocomial infections were the most frequent among NPPAEs, which could be related to the low immunity of pediatric patients, the lack of Healthcare Workers (HCW) awareness of Infection Control (IC) guidelines, and the low compliance of HCW with IC practices. Especially that most of the respondents are assigned to ICU and work with critically ill pediatric patients.

Female pediatric nurses showed higher BO and lower QOL scores than males; this result was congruent with a previous study (Azizkhani et al., 2014). However, another study found no differences between female and male nurses in terms of BO (Gandi et al., 2011). So, gender differences should be further studied to identify the factors that are contributing to pediatric nurses BO.

Also, higher BO and a lower QOL were found among pediatric nurses who perceived their salaries as insufficient than their counterparts. The inability to cover living expenses and the stress may explain this finding. This finding is consistent with a systematic review which concluded that nurses who perceived their salaries lower than their workloads were experiencing high levels of BO (Rezaei et al., 2018).

Also, Pediatric nurses who smoke reported lower QOL than non-smokers. The possible explanations might include both financial and health complications of smoking. This result is congruent with a previous study which found nurses who smoke are having lower health-related QOL (Sarna et al., 2008).

Pediatric nurses' age was negatively correlated with their BO. Also, unit capacity was positively correlated with nurses BO scores. These findings were consistent with a previous study which found that older nurses (above 36 years old) reported higher job satisfaction than their younger colleagues, and those working with a larger number of patients reported high BO scores (J. Wang et al., 2020).

Our study revealed that the QOL scores were negatively correlated with both BO and NPPAEs. These results are congruent with the literature; it was found that BO scores were associated with patient safety (de Lima Garcia et al., 2019); also, lower QOL was associated with poorer quality of patient care (Berger et al., 2015).

According to the hypothesized CS-CF-empowerment integrated model, the work-related variables impact BO both directly and indirectly through QOL and the NPPAEs. This model was partially supported by the results of the current study. The results of this study supported the direct association between some of the work-related variables (co-workers' support, job satisfaction, satisfaction with the monthly salary, participation in continuous education, and exposure to violence) and pediatric nurses' BO. Additionally, this study found that QOL is mediating the relationship between work-related variables and BO. Based on our hypothesized CS-CF-empowerment integrated model, it can be supposed that better work-related variables predict better QOL scores, which consequently predict lower BO scores.

Previous studies demonstrated that work-related variables have positive correlations with QOL. For example, one study found that a better quality of working life was positively related to a better QOL among nurses (Moradi et al., 2014). Similarly, work-related variables were found to be determinantal in improving nurses' QOL (Ibrahim et al., 2016). Also, one study found that nurses with longer experiences and higher salaries reported better QOL (Dos Santos et al., 2018). On the other hand, those nurses working in closed special units and working more than 36 hours per week reported lower QOL scores (Dos Santos et al., 2018).

In our study, we found that co-workers' support, job satisfaction, and continuous education have positively contributed to the work-related construct. So, the co-workers' support, higher satisfaction scores, and more involvement in continuous education activities would positively

improve nurses' QOL. On the other hand, exposure to violence and perception of salary have negatively contributed to the work-related construct. Thus, a lower perception of salary and a higher violence rate at workplace will affect QOL negatively. This finding matches the previous studies. For example, co-worker support was found to be a significant predictor of the different domains of QOL (Kowitlawkul et al., 2019).

The results of this study support the negative correlation between QOL and their ITL nursing jobs. In other words, nurses with better QOL will show less ITL their nursing jobs and vice versa. This finding matches a previous study, which found that a better mental QOL decreases nurses' ITL (Perry et al., 2017). After controlling the type of hospital, the change in the initial correlation showed a moderating effect of hospital type (university-affiliated or MOH) on the relationship between nurses' QOL and ITL. This finding matches a previous study that established a relationship between the type of health institution and nurses' ITL (Yamaguchi et al., 2016). The moderating effect of hospital type in the relationship between nurses' QOL and ITL can be explained by the different environments, strategies, and policies for each type of hospitals (Al Sabei et al., 2020). The varied strategies and policies will somehow alter the work environment (Al Sabei et al., 2020; Dos Santos et al., 2018) and affect the working QOL for all employees, including pediatric nurses. Consequently, QOL finally will affect nurses' satisfaction and ITL (Andresen et al., 2017). Also, the different management style across the different hospitals encompasses various levels of nurses' empowerment that finally affect their satisfaction and ITL (Yamaguchi et al., 2016). This study also found that pediatric nurses' QOL scores were significantly higher in university-affiliated hospitals than MOH hospitals. This finding is congruent with a previous study which found that the type of hospital and nurses' QOL are correlated (Moradi et al., 2014).

The results showed that the perceived health was negatively correlated with pediatric nurses' BO. In other words, the higher BO scores are associated with poorer health perception, which matches a previous study (S. H. Lin et al., 2014). The differences between the basic and partial correlation suggested a moderating effect for the shift type on the relationship between BO and perceived health. This finding can be explainable because nurses BO is known to affect their health (Fradelos et al., 2014; H. Khatatbeh, Pakai, Pusztai, et al., 2020; S. H. Lin et al., 2014). Also, night/ rotating shifts can exaggerate the impact of BO on nurses' perceived health (Ferri et al., 2016; Jensen et al., 2018).

Additionally, our study showed that nurses' BO is significantly different in nurses working on day shifts from those working on night/alternate shifts. Nurses working on night/alternate shifts showed higher BO scores. This finding is partially supported by a previous study, which found that job satisfaction is significantly lower among nurses working on shifts (Tahghighi et al., 2019). Our study also showed a significant difference in the perceived health between nurses working on day shifts and those working on night/alternate shifts. This result is compatible with a previous study, which found that sleep difficulties, tiredness, and cardiac symptoms are more common among nurses working on night shifts (Ferri et al., 2016).

6. Summary of novel findings

There are two original findings as novelties in the present thesis:

1. Paediatric nurses working at university-affiliated hospitals have better QOL than those working at ministry of health hospitals. Adopting university-affiliated hospitals' work environment in ministry of health hospitals can improve the nurses' QOL and decrease their intention to leave.
2. Common work shift is negatively correlated with nurses' perceived health, and positively with nurses' BO scores. Thus, balanced shift rotation is needed especially concerning the night/day shifts ratio. Additionally, paediatric nurses working usually on night/alternate shifts need motivation and support by giving financial incentives or decreasing weekly working hours.

7. Appendices

7.1. Questionnaires

Appendix A

Information Sheet and Consent form for Research Participation

Dear Paediatric Nurse

I am a PhD student at University of Pécs, Hungary; and I am doing my PhD research about burnout among paediatric nurses, their quality of life, and their perceived patient's adverse events. You are invited to participate in this study by responding to the questions below. Your participation is highly appreciated and your responses will help me to get more understating of how your experiences and feelings would affect your patients' outcomes.

If you have questions, you are free to ask them now. If you have questions later, you may contact the researchers at (**Haitham Khatatbeh**, haythamrn@gmail.com, 0782640577).

Title of Study: The Relationship between Paediatric Nurses' Burnout, Their Quality of Life, and Their Perceived Patient's Adverse Events.

Researcher's Name: Haitham Khatatbeh

Summary of The Study:

This research will assess the burnout among Paediatric nurses and their quality of life, and it will study the relationships between burnout, quality of life, and nurse's perceived patient's adverse events.

Thank you for the participation in this study.

- I confirm that I have read and understood the summary of this study, and I have had the opportunity to ask questions.
- I understand that my participation is voluntary.
- I understand that my name will be completely anonymous; my name will not appear anywhere in the study results.
- I understand that I am free to withdraw from the study at any time without giving any reason.
- I understand that participation in this study will involve no cost to me.
- I understand that I will not be paid or get any other benefits for completing this survey.
- There is no any expected potential risks or discomforts as a result to the participation in this study.
- I understand that Completing this survey will take approximately **20 minutes**.

I agree to participate in this study.

Signature: _____

Appendix B: Sociodemographics and Work Environment

Age (years): _____

Gender: Male Female

Marital status: Single Married Divorced Widowed

Number of children: _____

Weight (Kg): _____

Height (Cm): _____

Education: Master Bachelor Vocational

Secondary school with certification Secondary school

Job Contract: Annual Permanent Other: _____

Type of the Hospital: University-Hospital MOH Hospital Other: _____

Unit/ Ward: Ped. Ward Ped. ER PICU NICU Ped. Oncology Other: _____

How did you accept your current position in the paediatric ward?

I have been assigned to this unit by a nurse manager

I chose to work in this unit by myself I have been transferred to this unit

Do you have thoughts of changing your unit/ward? Yes No

Do you have thoughts of leaving nursing job? Yes No

Hospital beds capacity: _____

Unit/ Ward beds capacity: _____

Number of patients you are mostly assigned for: _____

The average number of inpatients in your unit: _____

Your common working shifts: Day shifts Night shifts Alternate shifts

Shift duration: 8 hours 12 hours Other: _____

Working on weekends: Never Sometimes Often Always

Working hours per week: _____

Break time per shift (minute): _____

Nursing Experience in paediatric ward/unit (years): _____

Total experience (years): _____

Nursing care model in your unit: Total patient care Functional Team Other: _____

Perceived workload: Very low Low Average High Very High

Your job satisfaction: Very poor Poor Intermediate Good Very Good

Your family support: V. weak Weak Fair Good V. good

Your manager support: V. weak Weak Fair Good V. good

Your co-workers support: V. weak Weak Fair Good V. good

How frequently you participate in continuous education?

Never Sometimes Often Always

Monthly salary perception: Enough Not enough

Transportation you use: Own or family car Hospital transportation Public transportation

Time available for your family: Enough Not enough

Exposure to violation: No violation Verbal Emotional Physical Other _____

Your absenteeism in the last 3 months: no 1 time 2 times 3 times or more

Do you care for the dying patients? Never Sometimes Often Always

Smoking: Non-smoker Light-smoker Heavy-smoker

Sleeping hours per day: _____

How do you perceive your health? Weak Fair Good V. good Excellent

Do you have chronic illnesses? Yes No

History of major surgeries: Yes No

Do you have a low Back Pain/ Disc Prolapse? Yes No

Do you have a history of psychological/mental disorders? Yes No

Your perceived self-esteem: Very low Low Average High

Appendix C: Copenhagen Burnout Inventory

	Always	Often	Sometimes	Seldom	Never/ almost never
Personal Burnout					
1. How often do you feel tired?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. How often are you physically exhausted?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. How often are you emotionally exhausted?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. How often do you think: "I can't take it anymore"?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. How often do you feel worn out?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. How often do you feel weak and susceptible to illness?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Always	Often	Sometimes	Seldom	Never/ almost never
Work-related Burnout					
1. Do you feel worn out at the end of the working day?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Are you exhausted in the morning at the thought of another day at work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Do you feel that every working hour is tiring for you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Do you have enough energy for family and friends during leisure time?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	To a very high degree	To a high degree	Somewhat	To a low degree	To a very low degree
5. Is your work emotionally exhausting?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Does your work frustrate you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Do you feel burnt out because of your work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Client-related Burnout					
	To a very high degree	To a high degree	Somewhat	To a low degree	To a very low degree
1. Do you find it hard to work with clients?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Does it drain your energy to work with clients?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Do you find it frustrating to work with clients?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Do you feel that you give more than you get back when you work with clients?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Always	Often	Sometimes	Seldom	Never/ almost never
5. Are you tired of working with clients?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Do you sometimes wonder how long you will be able to continue working with clients?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix D: WHO Quality of Life-BREF

Please read each question, assess your feelings, and circle the number on the scale for each question that gives the best answer for you.

	Very poor	Poor	Neither poor nor good	Good	Very good
1. How would you rate your quality of life ?	1	2	3	4	5

	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2. How satisfied are you with your health?	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things in the last two weeks.

	Not at all	A little	A moderate amount	Very much	An extreme amount
3. To what extent do you feel that physical pain prevents you from doing what you need to do?	1	2	3	4	5
4. How much do you need any medical treatment to function in your daily life?	1	2	3	4	5
5. How much do you enjoy life?	1	2	3	4	5
6. To what extent do you feel your life to be meaningful?	1	2	3	4	5
	Not at all	A little	A moderate amount	Very much	Extremely
7. How well are you able to concentrate?	1	2	3	4	5
8. How safe do you feel in your daily life?	1	2	3	4	5
9. How healthy is your physical environment?	1	2	3	4	5

The following questions ask about **how completely** you experience or were able to do certain things in the last two weeks.

	Not at all	A little	Moderately	Mostly	Completely
10. Do you have enough energy for everyday life?	1	2	3	4	5
11. Are you able to accept your bodily appearance?	1	2	3	4	5
12. Have you enough money to meet your needs?	1	2	3	4	5
13. How available to you is the information that you need in your day-to-day life?	1	2	3	4	5
14. To what extent do you have the opportunity for leisure activities?	1	2	3	4	5
	Very poor	Poor	Neither poor nor good	Good	Very good
15. How well are you able to get around ?	1	2	3	4	5

The following questions ask you to say how **good or satisfied** you have felt about various aspects of your life over the last two weeks.

	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
16. How satisfied are you with your sleep?	1	2	3	4	5
17. How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
18. How satisfied are you with your capacity for work?	1	2	3	4	5
19. How satisfied are you with yourself ?	1	2	3	4	5
20. How satisfied are you with your personal relationships?	1	2	3	4	5
21. How satisfied are you with your sex life?	1	2	3	4	5
22. How satisfied are you with the support you get from your friends?	1	2	3	4	5
23. How satisfied are you with the conditions of your living place?	1	2	3	4	5
24. How satisfied are you with your access to health services?	1	2	3	4	5
25. How satisfied are you with your transport?	1	2	3	4	5

The following question refers to **how often** you have felt or experienced certain things in the last two weeks.

	Never	Seldom	Quite often	Very often	Always
26. How often do you have negative feelings such as blue mood, despair, anxiety, depression?	1	2	3	4	5

Appendix E: Nurse Perceptions of Adverse Events

	Never	Once a month or less	A few times a month	Once a week	A few times a week	Every day
1. How often patients receive wrong medication or dose during last month?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. How often patients experience pressure ulcer during last month?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. How often patients experience falls after admission during last month?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. How often patients experience nosocomial infection during last month?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7.2. Ethical Approval



ID number FI 58544

UNIVERSITY OF PÉCS

*Faculty of Health Sciences
Doctoral School of Health Sciences*

To Whom It May Concern

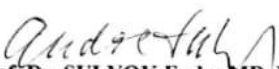
Pécs, 17.12.2019

Subject: Permission for Data Collection

The Doctoral School of Health Sciences (University of Pécs, Faculty of Health Sciences) is pleased to introduce Mr. Haitham Khatatbeh who is a Ph.D. student of the University of Pécs (Pécs, Hungary). He is registered for the Ph.D. programme in the Doctoral School of Health Sciences, Faculty of Health Sciences in the Frontiers of Health Sciences Programme.

He intends to start his research entitled "*The relationship between Paediatric Nurses' Burnout, Their Quality of Life, and Their Perceived Patient's Adverse Events*" which has been scientifically reviewed and approved. Herein we would like to kindly request your permission to collect data from the nurses working at Princess Rahma Paediatric Hospital (PRPH). Hoping to have your generous permission we look forward to a successful cooperation.

Yours Sincerely,


Prof. Dr. SÜLYÖK Endre MD, PhD, DSc
professor emeritus | *professor emeritus*



PÉCSI TUDOMÁNYEGYETEM | UNIVERSITY OF PÉCS
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وزارة الصحة

م ب ا / لجنة أخلاقيات / ٢١١٤

الرقم
التاريخ ٢٠١٩/١٢/٢٢
الموافق

مدير مديرية التعليم وتطوير الموارد البشرية

تحية طيبة وبعد،

اشارة لكتابكم رقم تطوير/خطط/ ١٢٦٥٣ تاريخ ٢٠١٩/١٢/٢٢ بخصوص البحث العلمي المقدم من قبل طالب الدكتوراه / هيثم عدنان محمد خطاطبه . ارفق بطيه قرار لجنة اخلاقيات البحث العلمي والمتضمن الموافقة على اجراء البحث العائد للمذكورين أعلاه.
للاطلاع واجراءاتكم لطفا.

واقبلو فائق الاحترام ،،،،،

مدير ادارة مستشفيات البشير

الدكتور محمود سليمان زريقات

١١٩٩٤٠

مديرية التعليم وتطوير الموارد البشرية
٢٠١٩/١٢/٢٢
الرقم

ع خ
تم



الرقم تطوير/عطف / ١٩٢
التاريخ
الموافق ٢٠٢٠ / ١١ / ٤

مدير مستشفى

تحية طيبة وبعد ،،،

أرفق طياً صورة عن كتاب مدير ادارة مستشفيات البشير / رئيس لجنة أخلاقيات
البحث العلمي رقم م ب أ / لجنة أخلاقيات / ٢١١١٤ تاريخ ٢٠١٩/١٢/٣٠ بخصوص الموافقة
لطالب الدكتوراه هيثم عدنان محمد خطاطبة إجراء بحث بعنوان :

**(The Relationship between Paediatric Nurses' Burnout, Their Quality of Life,
and Their Perceived Patient's Adverse Events)**

وذلك عن طريق توزيع الاستبيان المرفق صورة عنه على مرضى الأطفال في المستشفيات الحكومية
التابعة لوزارة الصحة .

أرجو التكرم بالإيعاز لمن يلزم تسهيل مهمة إجراء البحث أعلاه .

وتفضلوا بقبول فائق الاحترام ،،،

مدير مديرية التعليم وتطوير الموارد البشرية

الدكتورة رهام الحمود

م س



مستشفى الملك المؤسس عبدالله الجامعي
King Abdullah University Hospital

General Director Office

مكتب المدير العام

ص.ب (٦٢٠٠١) اربيد (٢٢١١٠) الأردن

هاتف: ٧٢٠٠٦٠٠ (٩٦٢-٢) فاكس: ٧٠٩٥٧٧٧ (٩٦٢-٢)

Ref. 13/3/17

الرقم:

Date: 5-1-2020

التاريخ:

Prof. Dr. Sulyok Endre, MD, PhD, DSc

الموافق:

Professor emeritus

Doctoral School of Health Sciences

Faculty of Health Sciences/ University of Pécs

Dear Doctor,

In reference to the scientific research which is presented by **Mr. Haitham Khatatbeh**, who is a PhD student in the Doctoral School of Health Sciences program, Faculty of Health Sciences/ University of Pécs, (Pécs, Hungary), entitled:

The Relationship between Paediatric Nurses' Burnout, Their Quality of Life and Their Perceived Patients' Adverse Events: A Comparative Study between Jordan and Hungary

We would like to inform you that the IRB Committee has granted **Mr. Haitham Khatatbeh** the approval to conduct this proposal in the Jordanian Community for the purpose mentioned above, in coordination with the Nursing Department at KAUH, under the following conditions:

1. Commitment to the Scientific Research Policy at Jordan University of Science and Technology and King Abdullah University Hospital.
2. Maintaining data confidentiality and using it only for scientific purposes.
3. Consent form is required.
4. This approval will be canceled if the principle investigator doesn't provide IRB with the final executive study report about the results of the research after thirty months.

Sincerely,

Prof. Mohammad Al-Ghazo

CEO KAUH

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7.5.Data Availability Statement

The raw data that support the results is available from the author upon a reasonable request.

7.6.Acknowledgements

First, I am extremely grateful to my supervisors, Dr. András Oláh and Dr. Annamária Pakai, for their invaluable advice and continuous support during my PhD study.

Also, I would also like to thank Dr. Miklós Zrínyi and Dr. Tariq Al-Dwaikat for the endless support. They have encouraged me in all the time of my academic research and daily life.

I am grateful to the Doctoral School of Health Sciences, first of all to Prof. Dr. József Bódis, the Head of the Doctoral School, to Prof. Dr. Endre Sulyok, Secretary of the Doctoral School of Health Sciences, Dr. Viktória Prémusz, Mrs. Piroska Bakonyi, and Mrs. Petra Szabó.

This work would not have been possible without the generous financial support of the Stipendium Hungaricum scholarship awarded by Tempus Public Foundation.

I also wish to thank the busy pediatric nurses for being generous and participating in this study.

Finally, I would like to express my gratitude to my mother, my brother, my wife, and my children. Without their incredible understanding and encouragement in the past few years, it wouldn't be possible to complete my study.

8. List of Publications

8.1.Full-text publications

8.1.1. Articles related to the thesis

Khatatbeh H, Al-Dwaikat T, Oláh A, Onchonga D, Hammoud S, Amer F, ... & Pakai A. (2021). The relationships between paediatric nurses' social support, job satisfaction and patient adverse events. *Nursing Open*. 8, 3575–3582.
<https://doi.org/10.1002/nop2.907>

Khatatbeh H, Pakai A, Al-Dwaikat T, Onchonga D, Amer F, Prémusz V, & Oláh A. (2021). Nurses' burnout and quality of life: A systematic review and critical analysis of measures used. *Nursing Open*.
DOI: [10.1002/nop2.936](https://doi.org/10.1002/nop2.936)

Khatatbeh H, Pakai A, Pusztai D, Szunomár S, Fullér N, Kovács-Szebeni G., ... & Oláh A. (2020). Burnout and patient safety: A discriminant analysis of paediatric nurses by low to high managerial support. *Nursing Open*. 8, 982–989.
<https://doi.org/10.1002/nop2.708>

Khatatbeh H, Zrínyi M, Oláh A, & Pakai A. (2022). The relationship between paediatric nurses' quality of life and intent to leave: The moderating role of hospital type. *Nursing Open*. 9, 676-683.
DOI: [10.1002/nop2.1116](https://doi.org/10.1002/nop2.1116)

Khatatbeh H, Al-Dwaikat T, Rababah J, Oláh A, & Pakai A. (2021). Paediatric nurses' burnout, quality of life and perceived patient adverse events during the COVID-19 pandemic: Testing an integrated model using structural equation modelling. *Journal of clinical nursing*. DOI: [10.1111/jocn.16114](https://doi.org/10.1111/jocn.16114)

8.1.2. Additional articles

Hammoud S, **Khatatbeh H**, Zand A, & Kocsis B. (2021). A survey of nurses' awareness of infection control measures in Baranya County, Hungary. *Nursing Open*. DOI: [10.1002/nop2.897](https://doi.org/10.1002/nop2.897)

Onchonga D, **Khatatbeh H**, Thuraniira M, Lennox K, & Venkatesh M. B. R. (2020). Assessing the usability of a Willingness to Quit smoking questionnaire in a sample of active tobacco smokers: A qualitative study. *Journal of Addictive Diseases*, 39 (1): 1-8. DOI: [10.1080/10550887.2020.1800891](https://doi.org/10.1080/10550887.2020.1800891)

Khatatbeh M, Alhalaiqa F, Khasawneh A, Al-Tammemi AB, **Khatatbeh H**, Alhassoun S, & Al-Omari O. The Experiences of Nurses and Physicians Caring for COVID-19 Patients: Findings from an Exploratory Phenomenological Study in a High Case-Load Country. *International Journal of Environmental Research and Public Health*. 2021; 18(17):9002. <https://doi.org/10.3390/ijerph18179002>

Khatatbeh M, Al-Maqableh H. O., Albalas S, Al Ajlouni S, A'aqoulah A, **Khatatbeh H**, ... & Al-Tammemi A. A. B. (2021). Attitudes and Commitment Toward Precautionary Measures Against COVID-19 Amongst the Jordanian Population: A Large-Scale Cross-Sectional Survey. *Frontiers in public health*, 9. DOI: [10.3389/fpubh.2021.745149](https://doi.org/10.3389/fpubh.2021.745149)

Amer F, Hammoud S, **Khatatbeh H**, Lohner S, Boncz I, and Endrei D. The deployment of balanced scorecard in health care organizations: is it beneficial? A systematic review. *BMC Health Services Research*, 22(1), 1-14. DOI: [10.1186/s12913-021-07452-7](https://doi.org/10.1186/s12913-021-07452-7)

8.2. Abstracts and oral presentations

8.2.1 Abstracts related to the thesis

Khatatbeh H, Pakai A, Zrínyi M, Prémusz V, Al-Dwaikat T, Khatatbeh M, Boncz I, Oláh A. PNS257 The Relationships of Sociodemographic and Work-Related Characteristics of Pediatric Nurses with Their Burnout, Quality of Life, and Perceived Patient Safety. *Value in Health*, 23: S684. (2020). DOI: [10.1016/j.jval.2020.08.1701](https://doi.org/10.1016/j.jval.2020.08.1701)

Khatatbeh H, Pakai A, Oláh A. Nurses' satisfaction and patient adverse events: A descriptive multi-site study. *Medical Conference for PhD Students and Experts of Clinical Sciences*. Pécs, Hungary. Abstract book, p.10 (2021). ISBN: 978-963-429-653-9

Khatatbeh H, Al-Dwaikat T, Pusztai D, Pakai A, Oláh A. Correlation between Burnout Among Paediatric Nurses, Their Quality of Life and Patients' Adverse Events in Jordan. *The 18th European Doctoral Conference in Nursing Science – EDCNS*. P.2 (2019). DOI: [10.1007/s16024-019-00330-7](https://doi.org/10.1007/s16024-019-00330-7)

8.2.2. Additional abstracts

Onchonga D, **Khatatbeh H**, Keraka M, MoghaddamHosseini V, Várnagy Á. Expectant Women's Perspective and Experience of Prenatal Fear of Childbirth in Kenya: A Qualitative Study. *Medical Conference for PhD Students and Experts of Clinical Sciences*. Pécs, Hungary. Abstract book, p.4(2019). ISBN: 978-963-429-291-3

Khatatbeh H, Gharaibeh M, Al-Faouri I. Medication errors committed by Jordanian nurses: An e-mail based study. *Medical Conference for PhD Students and Experts of Clinical Sciences*. Pécs, Hungary. Abstract book, p.74(2019). ISBN: 978-963-429-291-3

Khatatbeh H, Gharaibeh M, Al-Faouri I. Rate of Medication Errors Committed by Jordanian Nurses. *International Multidisciplinary Conference, SPRING WIND CONFERENCE 2019*, Debrecen, Hungary. Abstract book, p.546 (2019). ISBN: 978-615-5586-42-2

9. Submission of the doctoral dissertation and declaration of the originality of the dissertation

The undersigned,

Name: Haitham KHATATBEH

Maiden name: Haitham KHATATBEH

Mother's maiden name: wardeh khatatbeh

Place and time of birth: Jordan-Irbid, 30/05/1983

on this day submitted my doctoral dissertation entitled:

THE RELATIONSHIPS BETWEEN PEDIATRIC NURSES' BURNOUT, QUALITY OF LIFE, AND THEIR PERCEIVED PATIENT ADVERSE EVENTS

to the

PR-1. Frontiers of Health Sciences Programme

of the Doctoral School of Health Sciences, Faculty of Health Sciences, University of Pécs.

Names of the supervisor(s): Dr. habil. András Oláh, Dr. habil. Annamária Karamánné Pakai

At the same time, I declare that

- I have not submitted my doctoral dissertation to any other Doctoral School (neither in this country nor abroad),
- my application for degree earning has not been rejected in the past two years,
- in the past two years I have not had unsuccessful doctoral procedures,
- my doctoral degree has not been withdrawn in the past five years,
- my dissertation is independent work, I have not presented others' intellectual work as mine, the references are definite and full, on preparation of the dissertation I have not used false or falsified data.

Dated: 22/08/2021

signed by candidate

Supervisor

Co-supervisor

10. References

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Submission of the doctoral dissertation and declaration of the originality of the dissertation

The undersigned,
Name: Haitham Khatatbeh
Maiden name: Haitham Khatatbeh
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Place and time of birth: Jordan-Irbid, 30/05/1983

on this day submitted my doctoral dissertation entitled:

THE RELATIONSHIPS BETWEEN PEDIATRIC NURSES' BURNOUT, QUALITY OF LIFE, AND THEIR PERCEIVED PATIENT ADVERSE EVENTS

to the
PR-1. Frontiers of Health Sciences Programme
of the Doctoral School of Health Sciences, Faculty of Health Sciences, University of Pécs.
Names of the supervisor(s): Dr. habil. András Oláh, Dr. habil. Annamária Karamánné Pakai

At the same time, I declare that

- I have not submitted my doctoral dissertation to any other Doctoral School (neither in this country nor abroad),
- my application for degree earning has not been rejected in the past two years,
- in the past two years I have not had unsuccessful doctoral procedures,
- my doctoral degree has not been withdrawn in the past five years,
- my dissertation is independent work, I have not presented others' intellectual work as mine, the references are definite and full, on preparation of the dissertation I have not used false or falsified data.

Dated: 03/02/2022



signed by candidate



Supervisor



Co-supervisor