

Fatigue, burnout, work environment, workload and perceived patient safety culture among critical care nurses

Qasim AL Ma'mari, Loai Abu Sharour and Omar Al Omari

ABSTRACT

A study was conducted to explore whether fatigue, workload, burnout and the work environment can predict the perceptions of patient safety among critical care nurses in Oman. A cross-sectional predictive design was used. A sample of 270 critical care nurses from the two main hospitals in the country's capital participated, with a response rate of 90%. The negative correlation between fatigue and patient safety culture ($r=-0.240$) indicates that fatigue has a detrimental effect on nurses' perceptions of safety. There was also a significant relationship between work environment, emotional exhaustion, depersonalisation, personal accomplishment and organisational patient safety culture. Regression analysis showed that fatigue, work environment, emotional exhaustion, depersonalisation and personal accomplishment were predictors for overall patient safety among critical care nurses ($R^2=0.322$, $F=6.117$, $P<0.0001$). Working to correct these predictors and identifying other factors that affect the patient safety culture are important for improving and upgrading the patient safety culture in Omani hospitals.

Key words: Burnout ■ Fatigue ■ Patient safety ■ Work environment ■ Workload ■ Critical care nurses

Patient safety is considered to be one of the most important health issues across the world (World Health Organization (WHO), 2016) and has been defined as the 'absence of preventable harm to a patient and reduction of risk of unnecessary harm associated with health care to an acceptable minimum' (WHO, 2017). It has an impact on both patient outcomes and the healthcare system itself; it is deemed to be one of the credible measures of a hospital's performance (Welp et al, 2015), and is an important factor in ensuring the delivery of high-quality health care (Rajalatchumi et al, 2018).

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WHO (2017) has stressed the importance of identifying factors that affect patient safety and monitoring improvements in patient safety. About 43 million patient safety events occur worldwide every year, with the estimated cost of medication errors amounting to US \$42 billion. This is considered the third patient safety challenge, after healthcare-associated infection and safe surgery (WHO, 2017).

Nurses working in critical care units (CCUs) have to be fully alert to ensure delivery of safe patient care (Scott et al, 2014). Factors that can have a negative effect on patient safety identified from literature include fatigue (Barker and Nussbaum, 2011). For example, nurses who are fatigued are vulnerable to making errors in clinical judgment and medication administration, factors that have been linked to adverse patient outcomes (Scott, et al, 2014). Another contributing factor to negative consequences such as medication errors and patient falls is increased workload (Magalhães et al, 2013; Carlesi et al, 2017). Nurse burnout has been linked to decreased quality of care (Nantsupawat et al, 2016; Salyers et al, 2017) and a poor work environment to an increase in hospital-acquired pressure ulcers (Ma and Park, 2015).

Although patient safety is acknowledged to be a critical factor in the delivery of health care, few studies have been conducted in developing countries. For example, just two studies have been conducted in Oman to assess perceptions of patient safety (Al-Mandhari et al, 2014; Ammouri et al, 2015). The first study was published in 2014. Its results were consistent with previous international studies on patient safety, and emphasised the importance of teamwork, a no-blame culture and management support in enhancing patient safety (Al-Mandhari et al, 2014). A second descriptive study was published the following year (Ammouri et al, 2015) and explored nurses' perceptions of their workplace safety culture. It identified factors that may contribute to patient safety, which included learning and continuous improvement, hospital management support, supervisor/manager expectations, feedback and communication about error, teamwork, hospital handovers and shift changes. The researchers recommended that hospitals prioritise these factors in order to enhance the patient safety culture.

To date, no studies have been undertaken among critical care nurses in Oman to demonstrate a relationship between patient safety and the hypothesised factors (fatigue, workload, burnout, and work environment). In view of this dearth of information,

this study aimed to identify predictors for perceived patient safety among critical care nurses in two hospitals in the country's capital, Muscat. Specifically, the aim was to explore whether there is a relationship between the variables fatigue, workload, burnout and work environment, and perceived patient safety among critical care nurses.

Methods

Design and purpose

A descriptive cross-sectional design was used to assess predictors of perceived patient safety among critical care nurses working in Oman.

Sample and setting

The study was conducted in two major government hospitals in Muscat: the Royal Hospital and the Sultan Qaboos University Hospital (SQUH), a teaching hospital. All nurses working in critical care, including neonatal intensive care units (NICUs), paediatric ICUs, adult ICUs, coronary care units and post-cardiac surgery units, were invited to participate. This workforce numbers around 500 nurses. Slovin's formula (Tejada and Punzalan, 2012) was used to estimate the sample size required for the study, using a confidence interval of 95%; this resulted in an estimate of 222 participants. The survey was subsequently circulated to 300 participants to mitigate for attrition.

Convenience sampling was used. The survey was distributed between June and September 2018, and responses were received from 270 participants (90% response rate). The researchers discussed and provided the CCU managers in each hospital with an overview of the purposes, methods and significance of the study. The researcher (QM) then identified participants who met the study's eligibility criterion: Omani and non-Omani nurses who had worked in critical care for at least 6 months. To ensure anonymity, the researcher approached potential participants and provided them with an information sheet, which informed them that a sealed package comprising the consent form and the survey instrument would be available in the nurses' changing room. Those willing to participate were given a week to complete the questionnaire at their convenience and leave their responses in a dedicated box, which the researcher then collected from each unit. This ensured that all responses were anonymous.

Ethical considerations

Approval to undertake the study was obtained from the review boards of each institution. Permission was also obtained from the ethical committees of the Omani College of Nursing (REC/2017-2018/10), the Royal Hospital ethics committee (SRC#46/2018), and the College of Medicine at SQUH (SQU-EC/030/18).

Permission to use the tools employed in the study was obtained from the original authors.

Participation was voluntary, and no identifying data were collected. Prior to completing the surveys, written informed consent was obtained from all nurses willing to participate.

Measurement tools

The study used a number of tools to gather a range of data and

Box 1. The 12 dimensions of the Hospital Survey on Patient Safety Culture

- Communication openness
- Feedback and communication about error
- Frequency of events reporting
- Handovers and shift changes
- Management support for patient safety
- Non-punitive response to error
- Organisational learning—continuous improvement
- Overall perceptions of safety
- Staffing
- Supervisor/manager expectations and actions promoting safety
- Teamwork across hospital units
- Teamwork within hospital units

Source: Sorra et al, 2016

to analyse the information related to fatigue, workload, burnout, and work environment to help predict the perceptions of patient safety among critical care nurses in selected hospitals in Oman.

Hospital survey instrument

The study administered the Hospital Survey on Patient Safety Culture (HSOPSC) to evaluate staff views on patient safety in a hospital setting; the tool was developed for this purpose by the Agency for Healthcare Research and Quality (Sorra and Dyer, 2010). It consists of 42 items grouped into 12 dimensions (Box 1). The survey tool also includes two questions asking participants to provide an overall patient safety score for their unit and to state the number of adverse events they have reported over the past 12 months. The outcome dimensions include 'overall perceptions of safety' and 'frequency of events reporting' (Sorra et al, 2016).

Most of the dimensions are scored on a 5-point Likert-type scale to reflect level of agreement, ranging from 1 ('I strongly disagree') to 5 ('I strongly agree'), with 3 scoring a neutral ('I neither agree nor disagree'). Other items are scored on a 5-point frequency scale, ranging from 1 ('never') to 5 ('always'). The survey includes both positively and negatively worded items, so the negative items were reverse coded. In this study, the instrument achieved a Cronbach's alpha value of 0.85, making it a valid and reliable tool. It is worth noting that, because the study was carried out within a culture that differs from that of Western countries, this may well have affected the Cronbach score.

Maslach survey

The study participants' experience of burnout was evaluated using the Maslach Burnout Inventory-Human Services Survey (MBI-HSS). The MBI was originally devised by Christina Maslach in 1981 (Maslach et al, 2019) with a number of versions subsequently developed to focus on more specific groups, including the MBI-HSS, which is used with healthcare staff and related professional groups. It consists of 22 items across three unique dimensions of burnout:

- Emotional exhaustion (EE): 9 items that measure feelings of being emotionally exhausted at work
- Depersonalisation (DP): 5 items that are intended to measure an unfeeling and impersonal response towards patients
- Personal accomplishment (PA): 8 items measuring feelings

Box 2. Subscales on the Practice Environment Scale of the Nursing Work Index

Five dimensions of the nurses' work environment	No of items
Nurse participation in hospital affairs	9
Nursing foundations for quality of care	10
Nurse manager ability, leadership and support	5
Staffing and resource adequacy	4
Collegial nurse–physician relations	3

Source: Gabriel et al, 2013

of competence and successful achievement in one's work.

The 7-point frequency scale for each dimension is as follows:

- 0: never
- 1: a few times a year or less
- 2: once a month or less
- 3: a few times a month
- 4: once a week
- 5: a few times a week
- 6: every day.

In the current study, the results indicated that the MBI-HSS was a valid and reliable tool on two of the dimensions, with Cronbach alpha values for PA of 0.74 and EE of 0.86; the Cronbach's alpha for DP was lower, with a value of 0.66. This lower value could be due to the cultural differences between the Western culture within which the scale was developed and Oman where the study was carried out.

Fatigue assessment scale

The Fatigue Assessment Scale (FAS) was developed by Michielsen et al (2003) and consists of 10 items. Five questions on the scale reflect physical fatigue and five mental fatigue. The 5-point scoring ranges from 1 ('never') to 5 ('always'). The total can range between 10 and 50. A total of less than 22 indicates no fatigue, whereas a score that is equal to or greater than 22 indicates fatigue.

In this study, the instrument showed acceptable internal consistency, with a Cronbach's alpha value of 0.76.

NASA task load index

The study used the space agency NASA task load index (NASA TLX) to measure subjective workload. It is a multidimensional tool consisting of six items that was developed by the Human Performance Group at the NASA Ames Research Center (Hart and Staveland, 1988). It provides an overall workload score based on a weighted average of ratings on six subscales:

- Mental demand
- Physical demand
- Temporal demand
- Performance
- Effort
- Frustration.

Each dimension is scored over a 100-point scale, which is subdivided into 20 steps of 5 points each. Overall workload

is represented by a combination of the six dimensions (Hart and Staveland, 1988).

In the current study, the results indicated that NASA TLX was a valid and reliable tool, with a Cronbach alpha value of 0.71.

Practice Environment Scale of the Nursing Work Index

Participants' work environments were evaluated using the Practice Environment Scale of the Nursing Work Index (PES-NWI), which consists of 31 items across five subscales (Lake, 2002); the PES-NWI measures dimensions of a nurse's work environment (Box 2) (Gabriel, et al, 2013). The scoring is based on a 4-point Likert scale: 1 ('strongly agree'), 2 ('agree'), 3 ('disagree') and 4 ('strongly disagree') (Gabriel et al, 2013). The composite is calculated as the mean of the five subscale scores (Lake, 2002).

In the current study, the results indicated that the PES-NWI was a valid and reliable tool, with a Cronbach alpha value of 0.96.

Demographic data

Demographic data were collected via a self-reported questionnaire, which elicited information on participants' age, gender, educational level, income, nationality, hospital type, experience in years, and weekly working hours.

Statistical analysis

The statistical software package SPSSv23 was used to manage and analyse the data. Data cleaning and verification were performed prior to undertaking the analyses. Descriptive analysis included the mean, standard deviation (SD), frequency (F) (defined as the number of individuals who gave the same answer) and percentage. Analysis was undertaken using Pearson's coefficient (*r*) to identify correlations between each of the independent variables (fatigue, workload, burnout, and work environment) and the dependent variable (overall perception of patient safety). Pearson's *r* is used to measure the statistical relationship, or association, between two continuous variables (Polit and Beck, 2008). It provides information about the magnitude of the association, or correlation, as well as the direction of the relationship.

The variables that showed correlation with the patient safety culture were included in the regression model. In the study reported here, the hypothesised dependent variable (overall perception of patient safety) was measured as a single continuous variable; the hypothesised independent variables (fatigue, workload, burnout, and work environment) were also measured as continuous variables. Simple multiple regression analyses were conducted and are described in this article.

Results

Sample characteristics

A total of 270 participants were included in the study from SQUH and the Royal Hospital. Most nurses were female (*n*=232; 85.9%) and 14.1% (*n*=38) were male. The majority of participants had a bachelor's degree (62.6%) and only 4.1% had a postgraduate degree. Participants' ages ranged from 24 to 56 years (mean=33.06, SD=5.82). Most of the nurses were not Omani nationals (81.5%)—they were from the Philippines and India. Participants' years of experience in

their units ranged from 1 to 30 years (mean=7.01, SD=5.05). Participants' characteristics are presented in *Table 1*.

Correlations between overall perception of patient safety, fatigue, workload, work environment and burnout

Pearson correlation analysis was undertaken to determine the relationship between the study variables (fatigue, burnout, work environment, and workload) and overall perception of patient safety. Normality tests were performed, and each sample was independent of the other, which allows for the use of Pearson's correlation. Pearson's *r* results showed that fatigue had a detrimental effect on the overall perception of patient safety culture ($r=-0.240, P<0.01$). There was a significant relationship between the work environment ($r=0.127, P<0.05$), emotional exhaustion ($r=-0.168, P<0.01$), depersonalisation ($r=-0.258, P<0.0001$), personal accomplishment ($r=0.159, P<0.01$), and overall perception of patient safety. There was also a non-significant negative relationship between workload ($r=-0.056$) and overall perceived patient safety, but this was not statistically significant ($P>0.05$) (*Table 2*).

Multivariate results between overall perception of patient safety, nurses' fatigue, work environment and burnout

A standard multiple regression (R^2) analysis was used to establish the relative contribution of the hypothesised predictors (fatigue, work environment and burnout) on overall perceived patient safety culture. A structured, three-phase approach was used to achieve a parsimonious regression model for this sample.

First, statistical assumptions related to normality (histogram and scatterplot were used), linearity, heteroscedasticity and independence of residuals were assessed. Second, the independent variables that showed a significant correlation with overall perception of patient safety were entered into the initial regression model. Third, only the variables that were correlated in the initial regression model were entered into the parsimonious regression model. This regression analysis was conducted to determine the magnitude of the interactions of independent variables in relation to the correlation matrix, beta weights and their significance level (*t* statistic and *P* value).

The independent variables that were correlated with overall perception of patient safety in the bivariate analyses (fatigue, work environment, EE, DP and personal PA) were included in the initial regression model. Regression analysis showed that nurses' fatigue, their work environment, EE, DP and PA were predictors for patient safety culture as perceived by critical care nurses working in Oman ($R^2=0.322$, adjusted $R^2=0.087$; $F=6.117$, $P<0.0001$). These predictors accounted 32.2% of the variance in the overall perceptions of patient safety. *Table 3* presents the regression results.

Discussion

This study was conducted to investigate the predictors of perceived patient safety among critical care nurses in two hospitals in Oman, and to identify to what extent these variables (fatigue, burnout, work environment and workload) predict how nurses

Table 1. Characteristics of study participants (n=270)

Variable	Number of participants (%)	Mean (SD)
Gender		
Male	38 (14.1)	
Female	232 (85.9)	
Nationality		
Omani	50 (18.5)	
Non-Omani	220 (80.5)	
Working hospital		
Sultan Qaboos University Hospital	130 (48.1)	
Royal Hospital	140 (51.9)	
Working units		
Paediatric intensive care unit (PICU)	55 (20.4)	
Cardiac coronary unit (CCU)	28 (10.4)	
Neonatal intensive care unit (NICU)	45 (16.7)	
Intensive care unit (ICU)	134 (49.6)	
Cardiac intensive care unit (CICU)	8 (3.0)	
Level of education		
Diploma	90 (33.3)	
Bachelor's degree	169 (62.6)	
Postgraduate degree	11 (4.1)	
Working time per week (hours)		36.84 (3.19)
Age (years)		33.06 (5.82)
Experience in current unit (years)		7.01 (5.05)
Monthly income (Omani Rial) (1 OMR=£2)		1069 (291.6)

Table 2. Correlation between study variables and overall perception of patient safety (n=270)

Variable	Pearson correlation (r)
Fatigue	-0.240**
Work environment	0.127*
Workload	-0.056
Burnout subscales	
Emotional exhaustion	-0.168**
Depersonalisation	-0.258**
Personal accomplishment	0.159**

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

participating in the study perceive patient safety.

The results showed that fatigue had a detrimental effect on nurses' overall perceptions of patient safety. This is in line with the results of previous studies that examined nurses' fatigue and its effect on performance. Previous work has shown that

fatigue affects nurses' neurocognitive functioning and limits their work performance, which in turn has an effect on patient safety (Geiger-Brown et al, 2012). Nurses' fatigue has been recognised as a threat to nurse and patient safety (American Nurses Association, 2014). In addition, nurses' mental fatigue has been linked to the severity of medical errors (Saremi and Fallah, 2013). Moreover, the results of the study reported here were consistent with the findings of research showing that high levels of nurse fatigue have a negative association with performance, which affects patient safety (Barker and Nussbaum, 2011).

The study results revealed that nurses' workloads were not correlated with the overall perceptions of patient safety. This might be because both hospitals:

- Comply with international guidance on nurse:patient ratio, which is 1:1 in critical care units (Ehikhametalor et al, 2019)
- Their staff benefit from attending lectures on how to manage work and time, presented by a specialist brought in by the hospital's administration
- The standard working week does not exceed 40 hours, so there was no association between workload and overall perception of patient safety.

Studies in US hospitals (Geiger-Brown and Trinkoff, 2010) reported that nurses who worked more than 40 hours a week have a significant risk of making errors, which ultimately affects patient safety. Although the findings of the current study show no significant relationship between workload and mortality rates (Morales et al, 2003), other studies have linked workload with increased incidence of events such as patient falls, central-line infections and medication errors (Seynaeve et al, 2011; Magalhães, et al, 2013; Carlesi et al, 2017). This may be related to the fact that in these studies the nurse:patient ratio per shift differed from that in the current study, resulting in increased workload, which had a negative impact on patient safety.

Further findings from this study indicated that nurses' work environment correlated positively with overall perceptions of patient safety. These results are in line with the findings of a systematic literature review (Stalpers et al, 2015) undertaken in Western countries such as the USA, New Zealand and the UK between 2004 to 2012 that assessed the association between features of the work environment and patient outcomes (delirium, malnutrition, pain, patient falls and pressure ulcers).

The result of the review found a significant relationship between the work environment and nurse-sensitive patient outcomes (Stalpers et al, 2015). Previous systematic reviews (Lang et al, 2004; Mallidou et al, 2011) found that the features of a good work environment included:

- Collaboration between nurses and physicians, which resulted in fewer patient falls and pressure ulcers
- Higher levels of nurse education
- The employment of nurses with more experience.

These three features promoted a good working environment and had a significant link with patient safety (Stalpers, et al, 2015). Other studies have shown an association between a good working environment and the quality of nursing care (Ma et al, 2015; Wei et al, 2018), and improved patient safety outcomes (Kirwan et al, 2013). The current study findings were consistent with these results. Therefore, there is a need to maintain a positive work environment by providing staff with continuing education opportunities and promoting multidisciplinary teamworking to ensure high levels of patient safety (Ammouri et al, 2015).

The results of the current study showed that EE had a negative correlation with the overall perception of patient safety. This is in line with previous research showing an association between high burnout scores and poor scores on patient safety (Profit et al, 2014; Vifladdt et al, 2016; Johnson et al, 2017).

There is a need to identify interventions to prevent and treat emotional exhaustion among nurses. This includes providing programmes such as an 8-week mindfulness-based stress reduction course reported by Cohen-Katz et al (2005) that included computer-based self-awareness and mindfulness training (Maslach and Leiter, 2005). Nurses can also benefit from interventions that take into account the wider picture, such as nurses' work and family relationships, and that use approaches that can help nurses to self-care and to deal with difficult emotions. Further interventions can include offering counselling services to reduce exhaustion, thereby helping to prevent burnout and improve patient safety (Henry, 2014).

DP also correlated negatively with overall perceptions of patient safety. The findings of the current study are in line with research demonstrating negative correlation between patient safety and depersonalisation (Profit et al, 2014; Vifladdt, et al, 2016). The findings are also consistent with a study that showed

Table 3. Multiple regression analysis of selected variables (fatigue, work environment, emotional exhaustion, depersonalisation and personal accomplishment) on overall perception of patient safety culture (n=270)

Predictor	Standardised coefficients beta	Standard error (SE)	t	95.0 % CI* for beta	
				Lower bound	Upper bound
Fatigue	-0.14	0.03	-1.65	-0.11	0.01
Work environment	0.05	0.01	0.79	-0.01	0.03
Burnout subscales					
Emotional exhaustion	0.09	0.02	0.93	-0.02	0.05
Depersonalisation	-0.23	0.03	-2.86	-0.14	-0.03
Personal accomplishment	0.13	0.01	2.07	0.00	0.05

R² 32.2% dependent variable: overall perception of patient safety; * CI = confidence interval

that there was a negative relationship between nurse burnout and nurses' perceptions of the patient safety culture. The results indicated that burnout was linked to lower perceptions regarding patient safety (Halbesleben et al, 2008).

PA, the third subscale for burnout, positively correlated with overall perceptions of patient safety in the current study. This echoes the results of a study showing that high levels of burnout are associated with perceptions of lower levels of patient safety (Vifladd et al, 2016).

The findings presented in this article have implications for the nursing profession and health policymakers, managers and nursing administrators. Identification of predictors for perceptions of patient safety is vital in order to put strategies in place to change attitudes and enhance patient safety. The findings can be used as a baseline and as a source of information that future research studies can build on. In addition, the concept of promoting a culture of patient safety should be incorporated in the undergraduate nursing curriculum as a key subject.

The research reported here has limitations: its cross-sectional nature constrains the ability to interpret the causal relationships between the study variables and the collected data; these were self-reported and therefore may have been subject to bias. It was therefore not possible to evaluate the causal relationship between the independent and dependent variables. However, the researcher sought to provide an initial understanding of the variables that predict the overall perception of patient safety culture among critical care nurses working in Oman.

It should be noted that cultural differences are likely to have affected the internal consistency of the tools used because these would have originally been developed within the context of Western cultures. This may account for the differences and lower internal consistency values calculated in this study. For example, Eiras et al (2014) showed that the HSOPSC had a Cronbach's alpha of value of 0.96. In this study the value was 0.85.

The Maslach survey dimensions have been shown to have Cronbach's alpha values of EE (0.80), PA (0.77) and DP (0.73) (Lheureux et al, 2017). In the current study the values were 0.77, 0.80 and 0.73 respectively.

The FAS has been shown to be a valid and reliable instrument with a Cronbach's alpha of 0.90 (De Vries et al, 2003). In this study the value was 0.76.

However, the value for the NASA task load index found in this study was close to that cited by Hoonakker et al (2011), who reported the test-retest reliability of the NASA TLX scale to be 0.77. In this study the value was 0.72.

The PES-NWI has been validated with a Cronbach alpha value range of 0.71–0.84 (Lake, 2002). In the current study, Cronbach's alpha value was calculated to be 0.96. The reason for the difference may be because the sample in this study was homogenous (ie comprised solely of nurses who worked in critical care units), whereas in Lake's study, the sample comprised a random selection of all nurses working in 16 hospitals.

Conclusion

The study showed that fatigue, the work environment, depersonalisation, emotional exhaustion and personal accomplishment were the predictors for perceptions of patient

KEY POINTS

- Patient safety is an essential indicator in any healthcare system and nurses play a key role in improving patient safety
- Fatigue, emotional exhaustion and depersonalisation negatively predict the perceived safety culture among critical care nurses
- Work environment and personal accomplishment positively predict the perceived safety culture among critical care nurses

safety among critical care nurses in Oman. It was observed that nurses' workloads did not have a statistically significant relationship with overall perceptions. A patient safety culture is pivotal in delivering high-quality health care, so it is important to identify factors that affect an organisation's patient safety culture from the nurses' perspective, in this case among critical care nurses in Oman. Ensuring patient safety is an important ambition for any health organisation and senior management in any healthcare institution—policymakers, managers and nursing administrators—must focus on these predictors and find strategies to address them in order to enhance patient safety. **BJN**

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- Al-Mandhari A, Al-Zakwani I, Al-Kindi M, Tawilah J, Dorvlo AS, Al-Adawi S. Patient safety culture assessment in Oman. *Oman Med J*. 2014;29(4):264–270. <https://doi.org/10.5001/omj.2014.70>
- American Nurses Association. Addressing nurse fatigue to promote safety and health/ joint responsibilities of registered nurses and employers to reduce risks. 2014. <https://tinyurl.com/qpwfdpe> (accessed 10 December 2019)
- Ammouri AA, Tailakh AK, Muliira JK, Geethakrishnan R, Al Kindi SN. Patient safety culture among nurses. *Int Nurs Rev*. 2015;62(1):102–110. <https://doi.org/10.1111/inr.12159>
- Barker LM, Nussbaum MA. Fatigue, performance and the work environment: a survey of registered nurses. *J Adv Nurs*. 2011;67(6):1370–1382. <https://doi.org/10.1111/j.1365-2648.2010.05597.x>
- Carlesi KC, Padilha KG, Toffoletto MC, Henriquez-Roldán C, Juan MAC. Patient safety incidents and nursing workload. *Rev Lat Am Enfermagem*. 2017;25(0):e2841. <https://doi.org/10.1590/1518-8345.1280.2841>
- Cohen-Katz J, Wiley S, Capuano T, Baker DM, Deitrick L, Shapiro S. The effects of mindfulness-based stress reduction on nurse stress and burnout: a qualitative and quantitative study, part III. *Holist Nurs Pract*. 2005;19(2):78–86. <https://doi.org/10.1097/00004650-200503000-00009>
- De Vries J, Michielsen HJ, Van Heck GL. Assessment of fatigue among working people: a comparison of six questionnaires. *Occup Environ Med*. 2003;60(>90001) Suppl 1:10i–15. https://doi.org/10.1136/oem.60.suppl_1.i10
- Ehikhmetalor K, Fisher LA, Bruce C et al. Guidelines for intensive care unit admission, discharge and triage. *West Indian Medical Journal* 2019; 68(Suppl. 2): 46–54
- Eiras M, Escoval A, Grillo IM, Silva-Fortes C. The hospital survey on patient safety culture in Portuguese hospitals: Instrument validity and reliability. *Int J Health Care Qual Assur*. 2014;27(2):111–122. <https://doi.org/10.1108/IJHCQA-07-2012-0072>
- Gabriel AS, Erickson RJ, Moran CM, Diefendorff JM, Bromley GE. A multilevel analysis of the effects of the Practice Environment Scale of the Nursing Work Index on nurse outcomes. *Res Nurs Health*. 2013;36(6):567–581. <https://doi.org/10.1002/nur.21562>
- Geiger-Brown J, Rogers VE, Trinkoff AM, Kane RL, Bausell RB, Scharf SM. Sleep, sleepiness, fatigue, and performance of 12-hour-shift nurses. *Chronobiol Int*. 2012;29(2):211–219. <https://doi.org/10.3109/07420528.2011.645752>

- Geiger-Brown J, Trinkoff AM. Is it time to pull the plug on 12-hour shifts?: Part 1. The evidence. *JONA: The Journal of Nursing Administration*. 2010;40(3):100–102. <https://doi.org/10.1097/NNA.0b013e3181d0414e>
- Halbesleben JRB, Wakefield BJ, Wakefield DS, Cooper LB. Nurse burnout and patient safety outcomes: nurse safety perception versus reporting behavior. *West J Nurs Res*. 2008;30(5):560–577. <https://doi.org/10.1177/0193945907311322>
- Hart SG, Staveland LE. Development of NASA-TLX (Task Load Index): results of empirical and theoretical research. *Advances in Psychology* 1988;52:139–183. [https://doi.org/10.1016/S0166-4115\(08\)62386-9](https://doi.org/10.1016/S0166-4115(08)62386-9)
- Henry BJ. Nursing burnout interventions: what is being done? *Clin J Oncol Nurs*. 2014;18(2):211–214. <https://doi.org/10.1188/14.CJON.211-214>
- Hoonakker P, Carayon P, Gurses AP et al. Measuring workload of ICU nurses with a questionnaire survey: the NASA Task Load Index (TLX). *IIE Trans Healthc Syst Eng*. 2011;1(2):131–143. <https://doi.org/10.1080/19488300.2011.609524>
- Johnson J, Louch G, Dunning A et al. Burnout mediates the association between depression and patient safety perceptions: a cross-sectional study in hospital nurses. *J Adv Nurs*. 2017;73(7):1667–1680. <https://doi.org/10.1111/jan.13251>
- Kirwan M, Matthews A, Scott PA. The impact of the work environment of nurses on patient safety outcomes: a multi-level modelling approach. *Int J Nurs Stud*. 2013;50(2):253–263. <https://doi.org/10.1016/j.ijnurstu.2012.08.020>
- Lake ET. Development of the practice environment scale of the nursing work index. *Res Nurs Health*. 2002;25(3):176–188. <https://doi.org/10.1002/nur.10032>
- Lang TA, Hodge M, Olson V, Romano PS, Kravitz RL. Nurse–patient ratios: a systematic review on the effects of nurse staffing on patient, nurse employee, and hospital outcomes. *J Nurs Adm*. 2004;34(7–8):326–337. <https://doi.org/10.1097/00005110-200407000-00005>
- Lheureux F, Truchot D, Borteyrou X, Rasclé N. The Maslach Burnout Inventory–Human Services Survey (MBI–HSS): factor structure, wording effect and psychometric qualities of known problematic items. *Le travail humain* 2017; 80(2): 161–186 (available in French and English). <https://tinyurl.com/tzup7av> (accessed 19 December 2019)
- Ma C, Olds DM, Dunton NE. Nurse work environment and quality of care by unit types: A cross-sectional study. *Int J Nurs Stud*. 2015;52(10):1565–1572. <https://doi.org/10.1016/j.ijnurstu.2015.05.011>
- Ma C, Park SH. Hospital magnet status, unit work environment, and pressure ulcers. *J Nurs Scholarsh*. 2015;47(6):565–573. <https://doi.org/10.1111/jnu.12173>
- Magalhães AMM, Dall’Agnol CM, Marck PB. Nursing workload and patient safety—a mixed method study with an ecological restorative approach. *Rev Lat Am Enfermagem*. 2013;21 spec:146–154. <https://doi.org/10.1590/S0104-11692013000700019>
- Mallidou AA, Cummings GG, Estabrooks CA, Giovannetti PB. Nurse specialty subcultures and patient outcomes in acute care hospitals: A multiple-group structural equation modeling. *Int J Nurs Stud*. 2011;48(1):81–93. <https://doi.org/10.1016/j.ijnurstu.2010.06.002>
- Maslach C, Jackson SE, Leiter MP, Schaufeli WB, Schwab RL. Maslach burnout inventory sampler set manual, general survey, human services survey, educators survey, & scoring guides. *Mind Garden*. 2019. <https://tinyurl.com/vkvjtc8> (accessed 10 December 2019)
- Maslach, C, Leiter, M. Reversing burnout. How to rekindle your passion for your work. *Stanford Social Innovation Review*. Winter 2005. <https://tinyurl.com/v4zk3rf> (accessed 22 November 2019)
- Michielsen HJ, De Vries J, Van Heck GL. Psychometric qualities of a brief self-rated fatigue measure. *J Psychosom Res*. 2003;54(4):345–352. [https://doi.org/10.1016/S0022-3999\(02\)00392-6](https://doi.org/10.1016/S0022-3999(02)00392-6)
- Morales IJ, Peters SG, Afessa B. Hospital mortality rate and length of stay in patients admitted at night to the intensive care unit. *Crit Care Med*. 2003;31(3):858–863. <https://doi.org/10.1097/01.CCM.0000055378.31408.26>
- Nantsupawat A, Nantsupawat R, Kunaviktikul W, Turale S, Poghosyan L. Nurse burnout, nurse-reported quality of care, and patient outcomes in Thai hospitals. *J Nurs Scholarsh*. 2016;48(1):83–90. <https://doi.org/10.1111/jnu.12187>
- Polit DF, Beck CT. *Nursing research. Generating and assessing evidence for nursing practice*. 9th edn. Lippincott Williams & Wilkins. 2008
- Profit J, Sharek PJ, Amspoker AB et al. Burnout in the NICU setting and its relation to safety culture. *BMJ Quality & Safety* 2014; 23(10), 806–813. <https://doi.org/10.1136/bmjqs-2014-002831>
- Rajalatchumi A, Ravikumar T, Muruganandham K et al. Perception of patient safety culture among health-care providers in a tertiary care hospital, South India. *J Nat Sci Biol Med*. 2018;9(1):14–18. https://doi.org/10.4103/jnsbm.JNSBM_86_17
- Salyers MP, Bonfils KA, Luther L et al. The relationship between professional burnout and quality and safety in healthcare: a meta-analysis. *J Gen Intern Med*. 2017;32(4):475–482. <https://doi.org/10.1007/s11606-016-3886-9>
- Saremi M, Fallah MR. Subjective fatigue and medical errors among nurses in an educational hospital. *Iran Occupational Health*. 2013;10(4):1–8
- Scott LD, Arslanian-Engoren C, Engoren MC. Association of sleep and fatigue with decision regret among critical care nurses. *Am J Crit Care*. 2014;23(1):13–23. <https://doi.org/10.4037/ajcc2014191>
- Seynaeve S, Verbrugge W, Claes B, Vandenplas D, Reyntjens D, Jorens PG. Adverse drug events in intensive care units: a cross-sectional study of prevalence and risk factors. *Am J Crit Care*. 2011;20(6):e131–e140. <https://doi.org/10.4037/ajcc2011818>
- Sorra JS, Dyer N. Multilevel psychometric properties of the AHRQ hospital survey on patient safety culture. *BMC Health Serv Res*. 2010;10:199. <https://doi.org/10.1186/1472-6963-10-199>
- Sorra J, Gray L, Streagle S, Famolaro T, Yount N, Behm J. AHRQ hospital survey on patient safety culture: user’s guide. Rockville (MD): Agency for Healthcare Research and Quality; 2016
- Stalpers D, de Brouwer BJM, Kaljouw MJ, Schuurmans MJ. Associations between characteristics of the nurse work environment and five nurse-sensitive patient outcomes in hospitals: a systematic review of literature. *Int J Nurs Stud*. 2015;52(4):817–835. <https://doi.org/10.1016/j.ijnurstu.2015.01.005>
- Tejada JJ, Punzalan JRB. On the misuse of Slovin’s formula. *The Philippine Statistician*. 2012;61(1):129–136. <https://tinyurl.com/w2jt6q4> (accessed 22 November 2019)
- Vifladt A, Simonsen BO, Lydersen S, Farup PG. The association between patient safety culture and burnout and sense of coherence: a cross-sectional study in restructured and not restructured intensive care units. *Intensive Crit Care Nurs*. 2016;36:26–34. <https://doi.org/10.1016/j.iccn.2016.03.004>
- Wei H, Sewell KA, Woody G, Rose MA. The state of the science of nurse work environments in the United States: a systematic review. *Int J Nurs Sci*. 2018;5(3):287–300. <https://doi.org/10.1016/j.ijnss.2018.04.010>
- Welp A, Meier LL, Manser T. Emotional exhaustion and workload predict clinician-rated and objective patient safety. *Front Psychol*. 2015;5(1573):1573. <https://doi.org/10.3389/fpsyg.2014.01573>
- World Health Organization. *Patient safety assessment manual*. 2nd edn. 2016. www.who.int/iris/handle/10665/249569 (accessed 22 November 2019)
- World Health Organization. *Patient safety: making health care safer*. 2017. <https://tinyurl.com/tmx64ts> (accessed 22 November 2019)

CPD reflective questions

- Consider how nursing practices and caring behaviours can affect patient safety. List the factors that could have a detrimental effect on nurses’ ability to deliver high-quality care
- Reflect on the current safety culture practice in your area and identify how patient safety could be improved
- A poor workplace culture can be detrimental to patient safety. How could managers help improve this and thereby the safety culture among the nurses in your organisation?

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