

Relationship between nurse burnout, patient and organizational outcomes: Systematic review

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ABSTRACT

Background: Burnout, characterized by emotional exhaustion, depersonalization, and decreased personal accomplishments, poses a significant burden on individual nurses' health and mental wellbeing. As growing evidence highlights the adverse consequences of burnout for clinicians, patients, and organizations, it is imperative to examine nurse burnout in the healthcare system.

Objective: The purpose of this review is to systematically and critically appraise the current literature to examine the associations between nurse burnout and patient and hospital organizational outcomes.

Design and data sources: A systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses was conducted. PubMed, CINAHL, PsychInfo, Scopus, and Embase were the search engines used. The inclusion criteria were any primary studies examining burnout among nurses working in hospitals as an independent variable, in peer-reviewed journals, and written in English. The search was performed from October 2018 to January 2019 and updated in January and October 2020.

Results: A total of 20 studies were included in the review. The organizational-related outcomes associated with nurse burnout were (1) patient safety, (2) quality of care, (3) nurses' organizational commitment, (4) nurse productivity, and (5) patient satisfaction. For these themes, nurse burnout was consistently inversely associated with outcome measures.

Conclusions: Nurse burnout is an occupational hazard affecting nurses, patients, organizations, and society at large. Nurse burnout is associated with worsening safety and quality of care, decreased patient satisfaction, and nurses' organizational commitment and productivity. Traditionally, burnout is viewed as an individual issue. However, reframing burnout as an organizational and collective phenomenon affords the broader perspective necessary to address nurse burnout.

Tweetable abstract: Not only nurse burnout associated w/ worsening safety & quality of care, but also w/ nurses' organizational commitment and productivity. Reframing burnout, as an organizational & collective phenomenon is necessary.

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What is already known

- The prevalence rate of burnout among nurses working in hospitals range widely from 5 to up to 50%, based on the specialties and geographical regions.
- Burnout, resulting from chronic and constant occupational stress, is associated with a range of individual adverse health

outcomes such as chronic pain, gastrointestinal distress, depression, and even mortality.

- Burnout also potentially endanger patients and colleagues with absenteeism, presentism, turnover, and medical error. However, a comprehensive review of such a phenomenon is limited.

What this paper adds

- This review demonstrates that burnout, especially emotional exhaustion of nurses, is negatively associated with the quality and safety of care, patient satisfaction, nurses' organizational commitment, and productivity.

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- Burnout could potentially predict patient safety and quality of care better than either demographic or organizational characteristics, but the evidence for such a conclusion is limited.

1. Introduction

Burnout—characterized by emotional exhaustion, depersonalization, and decreased personal accomplishment—runs rampant among healthcare professions, including nursing (NAM, 2019). This phenomenon results from constant and chronic occupational stress (Maslach, 2016), a prominent characteristic of nursing work. More than half of the four million nurses in the United States (NAM, 2019) and one in ten nurses around the world have reported experiencing burnout (Woo et al., 2020). Several individual-level factors are associated with burnout, including gender (Purvanova et al., 2010), marital status (Adriaenssens et al., 2015), and the tendency of health care workers to prioritize patient care over their own wellbeing (Kieft et al., 2014). That said, burnout is also a product of organizational-level factors emanating from work environments, such as higher nurse-patient ratios, increased electronic documentation, scheduling challenges, and administration issues (Kieft et al., 2014; Laschinger et al., 2012; Liu et al., 2018; Marques-Pinto et al., 2018; Wang et al., 2015).

Due to the emotional, physical, and psychological toll burnout takes on the afflicted, it is a significant predictor for heart disease, chronic pain, gastrointestinal distress, depression, and even mortality (Salvagioni et al., 2017). Even an antecedence for burnout, such as a diminished sense of fairness within an organization, increased one's odds of having a diagnosable medical condition by 50%—an effect significantly greater than that of exposure to secondhand smoke (Goh et al., 2016). Indeed, some estimate that workplace stress is associated with upwards of 120,000 deaths per year (Goh et al., 2016). Certain costs of the burnout epidemic are proximate and calculable, such as the estimated \$125–190 billion per year spent addressing stress-related health problems associated with work (Goh et al., 2016). Other costs, however, are more difficult to measure, such as diminished productivity, higher rates of turnover, and the dissipation of capable talent.

Having established the negative consequences of burnout on individuals and their health, more recent scholarship conceptualizes the organizational and societal implications of this phenomenon, emphasizing, in particular, the potential of burnout to endanger patients and colleagues due to higher rates of absenteeism, presentism, turnover, and medical error (Kieft et al., 2014; Hall et al., 2016). Put simply, individuals who have reached the point of burnout in their professional lives can potentially endanger themselves and those around them. Nurses facilitate care through frequent and direct contact with patients and their families in almost all healthcare settings, especially in hospitals (Kieft et al., 2014; McNair et al., 2016).

The Quality Health Outcome (QHO) model guided this review for its incorporation of the complex and multi-directional relationships among the three elements of the traditional structure-process-outcome model (Mitchell et al., 1998). According to the QHO model, the relationships among the system, intervention, client, and outcomes are dynamic and reciprocal, thus analysis of each component is necessary to provide a comprehensive picture of the complexity of patient care in healthcare settings. Recently, there has been a surge in the literature on work-related stress and burnout among nurses, several systematic reviews (Adriaenssens et al., 2015; Chuang et al., 2016; Khamisa et al., 2013; Monsalve-Reyes et al., 2018) provided a comprehensive overview of the predictors and risk factors burnout and also the negative health consequences of chronic stress and burnout. However, we could not locate a review focused on the association between nursing burnout and

patient and organizational outcomes. Our systematic review, therefore, proposes to meet this critical need by systematically and critically appraising the current literature to examine the associations between nurse burnout and patient and organizational outcomes in hospital settings.

2. Methods

A systematic review searches, appraises, and synthesizes research evidence (Grant and Booth, 2009), aiming for an exhaustive and comprehensive inquiry. Such a review is especially important amid a vast array of scholarly literature. With more studies on occupational stress and burnout being published, a systematic review can deliver a comprehensive overview of the available evidence, identify research gaps, and offer recommendations for practice and future research (Grant and Booth, 2009; Meerpohl et al., 2012).

2.1. Search strategy and selection criteria

The present systematic review followed the guidelines of the Transparent Reporting of Systematic Review and Meta-Analyses (PROSPERO Register: CRD42019120932) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). In consultation with a health services librarian, we performed literature searches using keywords, MeSH terms, and Boolean operators. In addition to searching for 'burnout', we also included the three commonly used subscales of Maslach Burnout Inventory ('emotional exhaustion', 'depersonalization', and 'decreased personal accomplishments') to ensure the comprehensive capture of the literature. The keywords for patient and organizational outcomes were derived from the QHO model (Mitchell et al., 1998), which are operational structural and process measures (e.g., medication errors, patient satisfaction, job satisfaction, intent-to-leave). More details on the keywords and MeSH terms are listed in Supplement A. To be included in this review, studies needed to be any primary study that examined burnout among nurses working in hospitals as an independent variable (predictor), while written in English and having been published in a peer-reviewed journal. To keep the search broad and exhaustive, data restrictions were not applied, and we included all studies that included hospital nurses as a part of the sample. However, we excluded papers that aimed to identify risk factors for burnout, given our emphasis on outcomes of nurse burnout. The three authors (JJ, RK, and JT) used the search engines PubMed, CINAHL, PsychInfo, Scopus, and Embase from October 2018 to February 2019, with an update in January and October 2020.

2.2. Quality appraisal

Given its ease and extensive use, we employed the Critical Appraisals Skills Programme (CASP) to appraise the quality of the included studies. There are twelve clear and concise questions in the CASP, answerable as *Yes*, *Can't tell*, and *No*. To systematically summarize the quality of each study, and to facilitate comparisons between different reviewers, we assigned numeric values to each answer, rendering *Yes* as 2, *Can't tell* as 1, and *No* as 0. Two reviewers appraised each study independently and then compared the scores; with anything more than a 25% discrepancy between the total scores, a third reviewer provided an independent score. No study was excluded based on the quality appraisal as the purpose of the study was to appraise the current state of the science.

2.3. Data extraction

For data analysis, each study was read by at least three reviewers, and relevant data were extracted, including study characteristics, design, sample, setting, independent variable(s), outcome

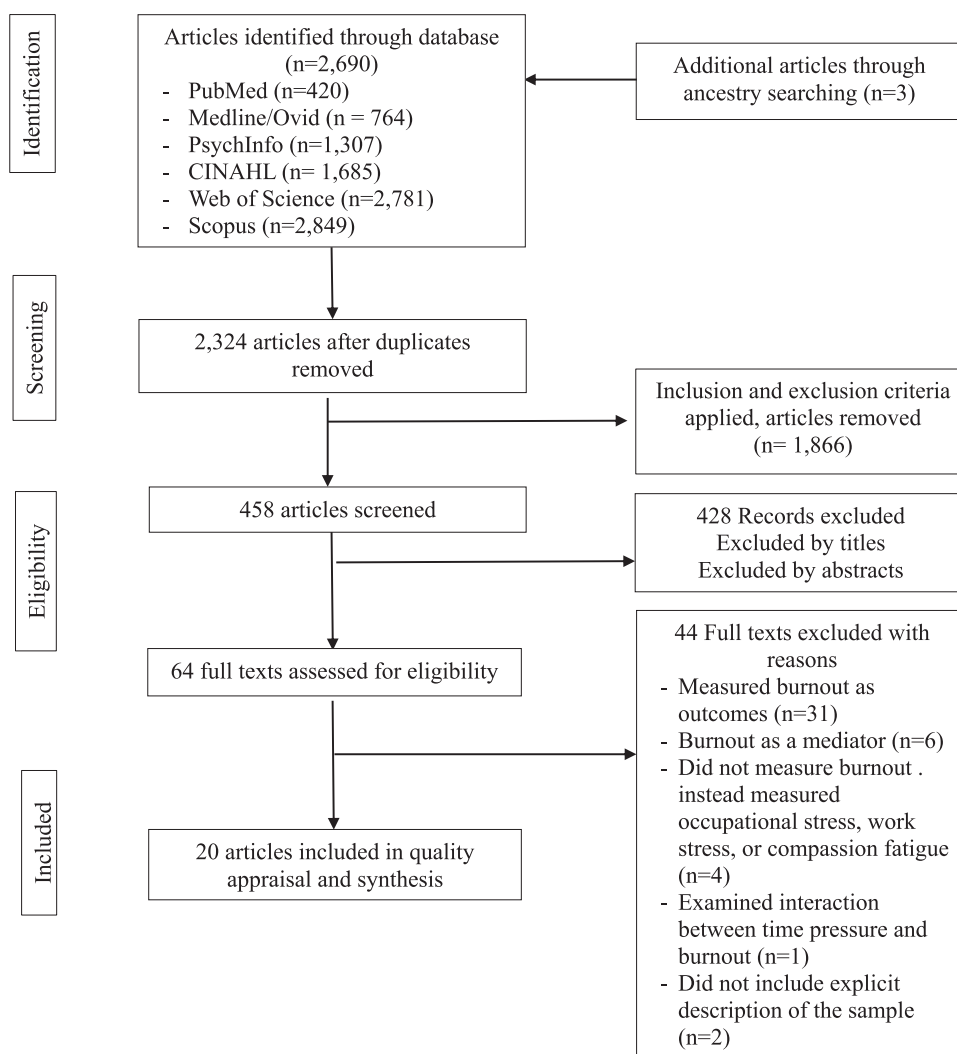


Fig. 1. PRISMA flowchart for literature selection. Adopted from PRISMA Guidelines (Moher, Liberati, Tetzlaff, Altman, & the PRISMA group, 2009).

variable(s), covariates, statistical results, results, and implications. These data were entered into the matrix for further synthesis.

3. Results

The PRISMA diagram shown in Fig. 1 demonstrates the literature search process and results. After removing duplicates, we identified 2324 articles. After applying inclusion and exclusion criteria, we reviewed the abstracts of 458 articles. Sixty-four articles met the inclusion criteria for full-text review; after evaluating the full-text versions of these articles, we included 20 in this review. Most articles omitted at this step measured burnout as an outcome, rather than as a predictor or mediator.

3.1. Study characteristics

Table 1 presents descriptive details and quality appraisal. The nurses in these studies were primarily women (84.7%), between 20 and 60 years of age, and hailing from 14 countries, including the United States (6), Belgium (3), Canada (2), Taiwan (3), Brazil (2), Ecuador (1), Germany (1), Italy (1), Iran (1), Japan (1), New Zealand (1), Switzerland (1), the United Kingdom (1), and Thailand (1). The study by Poghosyan et al. (2010) included six different countries,

and the professional nursing experience of those study participants ranged from less than one year to more than 21 years. Two studies used either a national sample (Poghosyan et al., 2010) or a state sample of nurses (Cimiotti et al., 2012).

Each study used a cross-sectional design with burnout as a predictor (independent variable). The instrument most often used to measure burnout (in various versions) was the Maslach Burnout Inventory Scale ($n = 23$), although one study used the Copenhagen Burnout Inventory (Colindres et al., 2018). The Maslach Burnout Inventory has three subscales of burnout (emotional exhaustion, depersonalization, and personal accomplishments), whereas the Copenhagen Burnout inventory has none. The first subscale of the Maslach Burnout Inventory, emotional exhaustion, was measured and used in the analysis of all studies that reported subscales. The other two burnout subscales of Maslach Burnout Inventory (depersonalization and personal accomplishments) were not consistently used. For example, 15 studies included depersonalization (also referred to as cynicism), whereas only 11 included personal accomplishment. Three studies using the Maslach Burnout Inventory did not report or did not specify the subscales of burnout. Lastly, only four studies (20%) used theoretical or conceptual models to guide their inquiry: the social cognitive career theory (Chang et al., 2018), the conservation of resources theory

Table 1
Study Characteristics and Quality Appraisal.

Author (year), Country	Sample/Setting	Prevalence of (high) burnout	Age	Average Professional experience (years)	Measurement Tools	Total Score for Quality Appraisal (Max score 24)
Alves (2016), Brazil	Professional nurses (n = 267)	27.3%	34.9 (7.9)	8.8	<ul style="list-style-type: none"> • MBI • Job satisfaction • SAQ 	19.5
Chang (2017), Taiwan	Hospital nurses (n = 571)	NR	96.4% between the age of 20–40	<15	<ul style="list-style-type: none"> • MBI-HSS • Nursing professional commitment scale 	20
Chang et al. (2018), Taiwan	Hospital nurses (n = 570)	NR	88.8% between the age of 20–40	1–20	<ul style="list-style-type: none"> • MBI-HSS • Self-efficacy scale • Intention-to-leave scale 	18
Chao (2016), Taiwan	Hospital nurses and their patients/families (n = 98 pairs)	NR	30.6% between ages 31 and 40	1–3	<ul style="list-style-type: none"> • MBI • Coleman's emotional intelligence inventory 	20
Cimiotti et al. (2012), USA	Registered nurses in PA (n = 7076)	36.5%	44	17	<ul style="list-style-type: none"> • Quality of Care • MBI-HSS • AHA Annual Survey • PHC4 	19.5
Colindres (2018), Ecuador	Hospital nurses (n = 333)	35.8%	35.4	<10	<ul style="list-style-type: none"> • Copenhagen Burnout Inventory • Safety Climate Questionnaire • Effort-reward Imbalance questionnaire • Perceived risk of infection 	21
Galletta (2016), Italy	CCU providers (nurses and physicians, n = 130)	NR	73.1% were between 33 and 55 years old	1–3	<ul style="list-style-type: none"> • MBI-HSS • ICU questionnaire 	20.5
de Lima Garcia (2019), Brazil	Pediatric hospital nurses and nursing assistants (n = 117)	23.8 (nurses only)	19–60 yrs but this was all the participants	8	<ul style="list-style-type: none"> • Hospital survey of Patient Safety Culture (HSOPSC) 	17
Halbesleben (2008), USA	Hospital and outpatient nursing staff (RN, LPN, APRNs, n = 148)	NR	NR	3.64	<ul style="list-style-type: none"> • MBI • AHRQ Patient Safety Culture Survey 	20.5
Halbesleben et al. (2013), USA	<ul style="list-style-type: none"> • In-house pool RNs (n = 104) and their supervisors (n = 92) 	NR	36.06 (7.5)	Sample 1: 2.2	<ul style="list-style-type: none"> • MBI • Workarounds in healthcare • Medication administration System-Nurses Assessment of Satisfaction 	18.5
Leiter et al. (1998), Canada	<ul style="list-style-type: none"> • Hospital staff nurses (n = 243) Hospital nurses (n = 711)	NR	NR	Sample 2: 12.8 6–10	<ul style="list-style-type: none"> • MBI • Meaningfulness of work • Intention to quit • hospital quality questionnaire by patients 	18.5
McHugh et al. (2011), USA	National sample of Nurses (n = 68,724)	33% of hospital nurses 37% of nursing home nurses 22% of nurses in other settings	NR	NA	<ul style="list-style-type: none"> • Multistate nursing care and patient safety survey • HCAHPS survey • AHA annual survey of hospital 	21.5
Nantsupawat et al. (2016), Thailand	Hospital nurses (n = 2084)	32.2%	33	1–36	<ul style="list-style-type: none"> • MBI-HSS (translated into Thai) 	20
Nayeri (2009), Iran	Hospital nurses (n = 200)	30%	63% younger than 35yrs	<2 = 28.5% 3–10=35% 11–20=17.5% >21=19%	<ul style="list-style-type: none"> • MBI • Nurses' Productivity Questionnaire 	21

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Table 1 (Continued).

Author (year), Country	Sample/Setting	Prevalence of (high) burnout	Age	Average Professional experience (years)	Measurement Tools	Total Score for Quality Appraisal (Max score 24)
Parker (1995), USA	Hospital nurses (n = 73)	NR	43.3 (10.1)	7.6	<ul style="list-style-type: none"> • MBI • Nursing Stress Scale • Taylor Manifest Anxiety Scale • Performance measures 	21
Poghosyan (2010), USA, Canada, UK, New Zealand, Germany, and Japan	Nurses from 6 countries (n = 53,846)	NR	Ranges 29.2yrs (Japan) to 42.2yrs (Canada)	US 14.2 Canada 17.7 UK 10.9 Germany 12.5 New Zealand 15.5 Japan 7.3	<ul style="list-style-type: none"> • Nurse perceived quality of care 	21
Van Bogaert (2010), Belgium	Hospital nurses (n = 546) from direct-care units (n = 42)	NR	35.7	12.9	<ul style="list-style-type: none"> • MBI-HSS • NWI-R • Job satisfaction • Nurse-assessed quality of care questions • Adverse events 	21
van Bogaert (2013), Belgium	Psychiatric nurses (n = 357)	23%	36 yrs	12.3	<ul style="list-style-type: none"> • MBI-HSS • NWI-R • Nurse-assessed quality of care 	21
van Bogaert (2014), Belgium	Hospital nurses (n = 1201)	33%	38.5	15.5	<ul style="list-style-type: none"> • MBI-HSS • NWI-R • Job satisfaction • Nurse assessed quality of care • Adverse events 	22.5
Welp et al. (2015), Switzerland	Hospital nurses (n = 1130)	NR	39.1 (10.1)*	12.6	<ul style="list-style-type: none"> • MBI-HSS • Hospital Survey of Patient Safety Culture 	21

Abbreviations: AHRQ=Agency for Healthcare Research and Quality; CS=Cross-sectional, AWS=Areas of Work-life Scale; MBI-Maslach Burnout Inventory, MBI-HSS = Maslach Burnout Inventory-Human Service Survey, SAQ=Safety climate: Safety Attitudes Questionnaire, WIPL = Work Interface with Personal Life Scale, RR=Response Rate, NR=not reported, Practice scale, PHC4 = Pennsylvania Health Care cost containment Council, AHA = American Hospital Association, NWI-R=Nurse Work Index-Revised.

*not separated by profession.

(Halbesleben et al., 2013, 2008), and Donebedian's structure-process-outcome model (Nantsupawat et al., 2016).

3.2. Quality appraisal

The quality appraisal is an important step in a systematic review because it includes an evidence-based approach for evaluating research findings and examining their quality (CASP, 2018). The quality appraisal scores of individual studies included in this review ranged from 17 to 22.5 (out of a maximum score of 24) using the CASP cohort studies framework. The mean score for the quality appraisal was 20.7, indicating that these articles were of moderate quality. All studies had clearly identified research purposes, used appropriate methods, and reported results adequately; however, these works rarely identified or discussed bias and confounders, thereby lowering scores regarding the quality of evidence. Two questions about subject follow-ups were removed because every study employed a cross-sectional design without follow-ups. Most subject recruitments were prospective and within local contexts.

3.3. Burnout-related outcomes

We further synthesized and categorized the results from the 20 studies included in the review based on their measured outcomes. Table 2 presents an overview of patient and organizational outcomes, as well as summaries of evidence findings with quality levels.

Patient safety. As the most common outcome examined, patient safety was measured as nurses' perceived safety ratings of

the care being delivered on their units or nurses' safety reporting behaviors (Liu et al., 2018; Halbesleben et al., 2013, 2008; Nantsupawat et al., 2016; Alves et al., 2016; Welp et al., 2015). Emotional exhaustion was included in every study and was consistently negatively associated with perceived patient safety and nurses' reporting behaviors (Liu et al., 2018; Halbesleben et al., 2013, 2008; Nantsupawat et al., 2016; Alves et al., 2016; de Lima Garcia et al., 2019; Welp et al., 2015). Even though only one study examined mortality, higher emotional exhaustion was a significant predictor for increased mortality, which was, itself, an objective measure of patient safety ($B = 0.39, p = 0.03$; Welp et al., 2015). Depersonalization was also associated with increased nurse-reported adverse events (falls or medication errors). However, personal achievement was not consistently associated with nurses' safety reporting behaviors (Nantsupawat et al., 2016).

Quality of care. As with safety, quality of care was often measured as nurses' perception of care (rated either high or low) delivered within the workplace (Poghosyan et al., 2010; Van Bogaert et al., 2010, 2014; Chao et al., 2016; Van Bogaert et al., 2009, 2013). All three subscales of burnout were significantly associated with poor/fair assessments of quality by nurses evaluating their own provision of care, as well as the collective care of their nursing units (Poghosyan et al., 2010; Van Bogaert et al., 2010, 2014, 2009; Van Bogaert et al., 2013). That said, burnout was not significantly correlated with the quality of care as assessed by patients (Chao et al., 2016). In addition to nurses' perception of quality, infection rates and infection control were quality indicators used to examine the association with nurse burnout. In one study, burnout was significantly associated with increased rates of both urinary

Table 2
Summary of the thematic findings.

First author (year),	Outcomes measured	Emotional exhaustion (EE)	Depersonalization (DP)	Personal Achievement (PA)	Discussion
Safety of Care					
Nurse-reported (or perceived) including safety ratings, safety climate, nurses' safety reporting behaviors					
Alves (2016)	Perception of safety climate	<ul style="list-style-type: none"> • NS when controlling for job satisfaction 	N/A	N/A	<ul style="list-style-type: none"> • Higher level of EE of nurses, worse perceived patient safety. • But when included job satisfaction, job satisfaction was significant with safety climate.
de Lima Garcia (2019)	Patient safety climate	<ul style="list-style-type: none"> • Inversely a/w safety culture ($p < .05$) • Inversely a/w teamwork within the units ($p = .02$) 	<ul style="list-style-type: none"> • Negatively a/w communication ($p < .01$) • Negatively a/w frequency of event reporting ($p < .01$) • Negatively a/w teamwork ($p = .03$) 	<ul style="list-style-type: none"> • Negatively a/w open communication ($p < .01$) • Negatively a/w non-punitive response to safety errors ($p = .03$). 	<ul style="list-style-type: none"> • For all providers as a group, depersonalization was the highest where nursing had the highest emotional exhaustion. • Hospital organization directly influences the psychological behavior of the professionals and patient safety.
Halbesleben (2008)	Nurse-perceived safety of care Reporting behaviors	<ul style="list-style-type: none"> • Negatively a/w safety grade ($\beta = -0.40$, $p < .01$) • Safety perceptions ($\beta = -0.84$, $p < .01$) • Near miss reporting frequency ($\beta = -0.14$, $p < .01$) • Not a/w near-miss event reporting. 	<ul style="list-style-type: none"> • Negatively a/w safety grade ($\beta = -0.16$, $p < .05$) • safety perceptions ($\beta = -0.26$, $p < .05$) • near miss reporting frequency ($\beta = -0.36$, $p < .01$) • Not a/w near-miss event reporting. 	N/A	<ul style="list-style-type: none"> • EE and DP highly correlated. • Burned out health care professionals may be willing to invest their limited resources in extra-role behaviors that benefit coworkers or patients but not for the organization.
Welp et al. (2015)	Clinician-rated patient safety Mortality rate Length of stay	<ul style="list-style-type: none"> • Negatively a/w clinician-rated patient safety ($B = -0.25$, $p < .01$) • Negatively a/w standardized mortality • NS for length of stay ($B = 0.39$, $p < .05$) 	<ul style="list-style-type: none"> • Negatively a/w clinician-rated patient safety ($B = -0.16$, $p < .01$) • NS for standardized mortality • NS for length of stay 	<ul style="list-style-type: none"> • Positively a/w clinician-rated patient safety ($B = 0.18$, $p < .01$) • NS for standardized mortality • NS for length of stay 	<ul style="list-style-type: none"> • Burnout had a stronger association with patient safety than demographic or organizational characteristics.
Colindres (2018)	Adherence to infection control protocols	<ul style="list-style-type: none"> • Burnout was found to be negatively a/w an adherence to infection control precautions ($\beta = -0.18$, $p < .05$) 	N/A	N/A	<ul style="list-style-type: none"> • Burnout measured as a total, no subscale measurement reported. • Effort-reward imbalance had an incremental association with burnout.
Cimiotti et al. (2012)	Urinary tract infection Surgical site infection	<ul style="list-style-type: none"> • Positively a/w UTI ($\beta = 0.85$; $p = .03$) when controlled for staffing • Positively a/w surgical site infection ($\beta = 1.56$, $p < .01$) when controlled for staffing 	N/A	N/A	<ul style="list-style-type: none"> • Burnout measured as a total, no subscale measurement reported. • Staffing coefficient, no longer sig. for UTI or SSI when controlling for burnout.
Quality of Care					
Nurses' perception of the quality of care delivered (rated either high or low)					
Chao (2016)	Patient-rated quality of care	NS	NS	NS	<ul style="list-style-type: none"> • Moderating effect of emotional intelligent on the relationship between burnout and quality was not found.
Nantsupawat et al. (2016)	<ul style="list-style-type: none"> • Nurse-rated quality of care • Medication errors • Infections • Patient falls 	<ul style="list-style-type: none"> • a/w reporting of poor quality of care (AOR = 2.63, $p < .001$) • a/w occurrence of medication errors (AOR = 1.47, $p < .01$) • a/w infection (AOR = 1.32, $p < .05$) • NS for patient falls 	<ul style="list-style-type: none"> • a/w poorer perceived quality of care (AOR = 3.2, $p < .001$) • a/w medical errors (AOR = 1.83, $p < .001$) • a/w infections (AOR = 1.74, $p < .001$) • a/w patient falls (AOR = 2.06, $p < .001$) 	<ul style="list-style-type: none"> • Inversely a/w poorer perceived quality of care (AOR = 1.73, $p < .001$) • Inversely a/w medical errors (AOR = 1.49, $p < .01$) • NS with infections • Inversely a/w patient falls (AOR = 1.61, $p < .05$) 	<ul style="list-style-type: none"> • The subscales of burnout and nurses' perception of adverse outcomes on their units.

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Table 2 (Continued).

First author (year),	Outcomes measured	Emotional exhaustion (EE)	Depersonalization (DP)	Personal Achievement (PA)	Discussion
Poghosyan et al. (2010)	Nurse-rated quality of care	<ul style="list-style-type: none"> • a/w poor/fair care ratings in all countries (USA: OR = 1.08, $p < 0.01$) 	<ul style="list-style-type: none"> • a/w poor/fair RN care (USA: OR = 1.11, $p < 0.01$). 	<ul style="list-style-type: none"> • Inversely a/w less poor/fair care ratings in all countries (USA: OR = 0.96, $p < 0.01$) 	<ul style="list-style-type: none"> • High RN burnout levels were significantly a/w RN's appraisals of quality of care independent of RN characteristics, working conditions. • Nurses in Japan rated the highest in burnout, the US was the second highest. • Higher unit-level ratings of nurse practice environment significantly a/w lower levels of burnout. • All three burnout dimensions a/w quality of care.
Van Bogaert (2010)	Nurse-rated quality of care	<ul style="list-style-type: none"> • a/w perceived quality of care on the unit (AOR = 0.95, $p < 0.05$) 	<ul style="list-style-type: none"> • a/w the perceived quality of care at the last shift (AOR = 0.94, $p < 0.05$) 	<ul style="list-style-type: none"> • NS 	<ul style="list-style-type: none"> • Higher unit-level ratings of nurse practice environment significantly a/w lower levels of burnout.
Van Bogaert (2013)	Nurse-rated quality of care	<ul style="list-style-type: none"> • a/w increased quality of care (AOR = 0.92, $p < 0.001$) 	<ul style="list-style-type: none"> • a/w increased quality of care (AOR = 0.92, $p < 0.001$) 	<ul style="list-style-type: none"> • a/w increased quality of care (AOR = 1.08, $p < 0.01$) 	<ul style="list-style-type: none"> • All three burnout dimensions a/w quality of care.
Van Bogaert (2014)	Nurse-rated quality of care	<ul style="list-style-type: none"> • NS for nurse-rated quality of care when controlling for nurse work environments 	<ul style="list-style-type: none"> • NS for nurse-rated quality of care when controlling for nurse work environments 	<ul style="list-style-type: none"> • a/w nurse-rated quality of care (AOR = 1.45, $p < .05$) when controlling for nurse work environments. 	<ul style="list-style-type: none"> • Nurse work characteristics had an impact on job outcomes and quality of care but less relevant on adverse patient outcomes.
Patient experiences					
Leiter et al. (1998)	Patient satisfaction	<ul style="list-style-type: none"> • Negatively a/w patient satisfaction ($p < .05$) • When nurses had an increased sense of meaningfulness in their work, patients more satisfied with their care ($p < .01$) 	<ul style="list-style-type: none"> • Negatively a/w patient satisfaction ($p < .05$) 	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • Strain of exhaustion, the lack of meaningfulness in one's work, and the desire to quit may all be readily sensed in the way nurses interact with patients.
McHugh et al. (2011)	Patient satisfaction	<ul style="list-style-type: none"> • Burnout and Job satisfaction had a statistical significance on patient satisfaction (p value missing). 	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • The most satisfied and least burned out nurses were those who were not providing direct care.
Organizational commitment					
Nurses' job satisfaction and/or intent-to-leave					
Alves (2016)	Job satisfaction	<ul style="list-style-type: none"> • Negatively a/w job satisfaction (correlation = -0.45, $p < .001$) 	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • Increasing job satisfaction might result in a work climate favorable for patient safety.
Chang (2017)	Professional commitment	<ul style="list-style-type: none"> • Negatively a/w normative professional commitment (perceived obligation) ($B = -0.14$, $p < .01$) • Negatively a/w emotional attachment to their profession ($B = -0.20$, $p < .01$) 	<ul style="list-style-type: none"> • N/S 	<ul style="list-style-type: none"> • Negatively a/w professional commitment ($B = 0.23$, $p < .01$) 	<ul style="list-style-type: none"> • Burnout not associated with career changes. • Leaving the profession and leaving the organization are different. • social support appeared to reduce the negative association between emotional exhaustion to a non-significant level.
Chang et al. (2018)	<ul style="list-style-type: none"> • Self-efficacy • Intent-to-leave • Career interests • Outcome expectation 	<ul style="list-style-type: none"> • Negatively related to self-efficacy and outcome expectations. 	<ul style="list-style-type: none"> • NS 	<ul style="list-style-type: none"> • NS 	<ul style="list-style-type: none"> • Career interest negatively related to the intention to leave the organization, which further related to the intention to leave the profession.
Parker (1995)	<ul style="list-style-type: none"> • Job performance • Absenteeism • Intention to leave the organization 	<ul style="list-style-type: none"> • Negatively a/w self-rated ($p = .003$) and supervisor-rated ($p = .03$) job performance • Negatively a/w absenteeism ($p = .03$) • Negatively a/w intention to leave organization ($p < .01$) 	<ul style="list-style-type: none"> • NS 	<ul style="list-style-type: none"> • NS 	<ul style="list-style-type: none"> • Social support is more strongly related to the job performance indicators ($b = -0.27$, $p < .05$) than is the amount of stress experienced by the RN. • Neuroticism ($b = 0.27$, $p < .01$) and job stress ($b = 0.28$, $p < .01$) had a positive a/w burnout.

(Continued on next page)

Table 2 (Continued).

First author (year),	Outcomes measured	Emotional exhaustion (EE)	Depersonalization (DP)	Personal Achievement (PA)	Discussion
van Bogaert (2010)	Intent-to-stay	<ul style="list-style-type: none"> a/w intention to stay in the profession (AOR = 0.94, $p < .05$) 	NS	NS	<ul style="list-style-type: none"> 91% of nurses intended to stay in current jobs Higher unit-level ratings of practice environment significantly a/w lower levels burnout, increased job satisfaction and intention to stay.
van Bogaert (2013)	<ul style="list-style-type: none"> Intention to leave the profession Job satisfaction 	<ul style="list-style-type: none"> a/w intention to leave the profession (AOR = 0.92, $p < .01$) a/w job satisfaction (AOR = 0.94, $p < .01$) 	<ul style="list-style-type: none"> a/w intention to leave job (AOR = 0.84, $p < .01$) NS for job satisfaction 	<ul style="list-style-type: none"> Negatively a/w intention to leave job (AOR = 1.09, $p < .05$) NS for job satisfaction 	<ul style="list-style-type: none"> DP may be an important indicator for the experiences of nurses.
van Bogaert (2014)	<ul style="list-style-type: none"> Intention to leave the profession Job satisfaction 	<ul style="list-style-type: none"> a/w intention to leave the profession (AOR = 0.63, $p < .001$) a/w job satisfaction (AOR = 0.53, $p < .001$) 	<ul style="list-style-type: none"> a/w leave the profession (AOR = 1.57, $p < .01$) 	<ul style="list-style-type: none"> Negatively a/w intention to leave the profession (AOR = 1.57, $p < .01$) 	<ul style="list-style-type: none"> Nurse management had the strongest a/w nurses' intention to leave the profession.
Nurse productivity					
nurses or supervisors' perception of being productive					
Halbesleben et al. (2013)	Workaround (during medication administration)	<ul style="list-style-type: none"> Negatively a/w both in self-rated ($p < .01$) and supervisor-observed ($p < .01$) workaround during medication administration. 	N/A	N/A	<ul style="list-style-type: none"> As resources are limited, employees may turn their attention to simply getting work done (single loop), rather than carefully considering the underlying issues (double loop).
Nayeri (2009)	RN perceived productivity	<ul style="list-style-type: none"> Negative a/w productivity ($r = -0.50$, $p < .01$) 	NS	<ul style="list-style-type: none"> a/w productivity ($r = 0.57$, $p < .01$) 	<ul style="list-style-type: none"> Up to 40% of nurses reported high burnout and high productivity: workaholic a sign of burnout. Nurses with less than 5 years of experience had higher DP.

Notes: a/w = associated with; NS= Not significant; N/A = not applicable.

tract infection ($\beta = 0.85$, $p = .02$) and surgical site infections ($\beta = 1.58$, $p < .01$) even when controlling for patient severity and nurse and hospital characteristics (Cimiotti et al., 2012). Similarly, Colindres et al. (2018) found that burnout was a negative predictor of nurses' adherence to infection control precautions ($\beta = -0.18$, $t = -3.09$, $p < .05$). Meanwhile, another study (Galletta et al., 2016) examined nurse burnout and hospital-acquired infections in critical care units and suggested a different pathway. While nurse burnout was associated with hospital-acquired infections, it was team communication ($\beta = -0.37$, $p < .01$) that was negatively affected by burnout, which, in turn, could diminish team efficacy and increase infection rates ($\beta = -0.42$, $p < .001$; Galletta et al., 2016). Interestingly, social support appeared to reduce the negative association between emotional exhaustion to a non-significant level (Parker et al., 1995).

Organizational commitment. Nurses' commitment to their organizations, measured as an intent-to-leave, was a commonly examined professional outcome. All three burnout subscales were consistently and negatively associated with the intent to leave an organization (Van Bogaert et al., 2010, 2014, 2009). Nurses experiencing higher emotional exhaustion ($B = -0.14$, $p < .01$) and reduced personal achievement ($B = 0.23$, $p < .01$) had a reduced sense of emotional and professional commitment to their organizations (Chang et al., 2017).

Nurse productivity. Emotional exhaustion was also negatively associated with nurses' productivity ($r = -0.50$, $p < .01$) and performance ($r = 0.57$, $p < .01$), whereas personal accomplishment was positively associated with productivity ($r = 0.57$, $p < .01$; Nayeri et al., 2009; Parker et al., 1995). Higher emotional exhaustion was also associated with lower self-rated ($p < .01$)

and supervisor-rated ($p < .05$) job performance, higher rates of workaround during medication administration ($p < .01$), and increased absenteeism ($p < .05$; Halbesleben et al., 2013).

Patient experience. Patient experiences were also included in two studies, with both finding a negative association between nurse burnout and patient experiences (McHugh et al., 2011; Leiter et al., 1998). Leiter et al. (1998) argued that the strain of exhaustion, the lack of meaningfulness in one's work, and the desire to quit might all be readily sensed by patients in the course of their interactions with nurses. Increased emotional exhaustion among nurses was also related to lower patient satisfaction ($p < .05$; McHugh et al., 2011), and when nurses felt an increased sense of meaningfulness in their work, patients were more satisfied in all aspects of their experiences ($p < .01$; Leiter et al., 1998).

4. Discussion

This review demonstrates that burnout, especially emotional exhaustion of nurses, is associated with a range of adverse patient and organizational outcomes. The overall quality of the included studies was moderate due to their observational study design and their risks for bias. Even though burnout could potentially predict patient safety and quality of care better than either demographic or organizational characteristics, the evidence for such a conclusion is limited.

Burnout is a complex, dynamic phenomenon that unfolds over time (Salvagioni et al., 2017; Hall et al., 2016). In this review, we found that emotional exhaustion was the most consistently studied subscale of burnout, while depersonalization and professional achievement were less examined. Our findings also showed that

when nurses felt higher levels of burnout, they were more likely to score lower in terms of patient safety and quality of care on their units, independent of their demographic characteristics or working conditions. Although most studies used nurses' perceptions as indicators for patient safety and quality of care, concordance between nurses' perceptions and objective measurements have been established (Stalpers et al., 2015), implying that nurses' perceptions of safety and quality are not only a good alternate indicator but could also lead to a better screening process. Since the landmark IOM report, *To Err is Human*, many nurse researchers have focused on patient safety and quality of care; thus, it was unsurprising to see numerous studies of this sort included in this review. It could be that burnout negatively affects team communication and efficacy, leading to negative outcomes, including increased infection rates and lower adherence rates of infection control (Colindres et al., 2018; Galletta et al., 2016). These findings are consistent with other reviews on physician burnout and patient outcomes. For example, there was moderate evidence to support the inverse relationships between physician burnout and patient safety in two recent systematic reviews (Dewa et al., 2017; Garcia et al., 2019).

In addition to patient outcomes, burnout was consistently associated with the intention of nurses to leave their jobs (Parker et al., 1995; Leiter et al., 2009). The most recent national nursing sample survey (HRSA, 2020) revealed that 40% of nurses who left their position cited burnout as the reason. Retention and turnover have been chronic and persistent issues in the nursing workforce. In a 10-year national longitudinal study, up to 15% of newly licensed nurses indicated an intention to leave their jobs within the first year (Brewer et al., 2012), and almost half of the newly licensed nurses left their jobs within three years (Cho et al., 2012). While nursing turnover is unavoidable (Kovner et al., 2014), it still disrupts unit morale, threatens human resources, and impedes teamwork, among other negative consequences (Dewanto et al., 2018; Hayes et al., 2012; Jones et al., 2007; Jones, 2004). Even more, the financial costs associated with nursing turnover are astronomical. Turnover rates among physicians, including reduced clinical hours, account for more than 4 billion dollars per year (Han et al., 2019), and the costs associated with nursing turnover are estimated to be significantly greater. The estimated cost for each nurse leaving is between \$37,700 and \$58,400, amounting to the potential loss of \$5 to \$8 million dollars per hospital annually, assuming the latest hospital nursing turnover rate of 17.6% (NSI, 2020). With more than 6000 hospitals in the United States, nurse turnover at hospitals alone could have as much as \$40 billion dollars estimated loss a year collectively. Given this considerable expense, and in light of the compromised care associated with it, nursing burnout deserves the health care community's complete and immediate attention. Ultimately, nurse burnout has the potential to, directly and indirectly, affect the healthcare system on a national and regional scale.

Though burnout is not currently considered an occupational "disease" in the United States, nine European countries (Denmark, Estonia, France, Hungary, Latvia, Netherlands, Portugal, Slovakia, and Sweden) have included burnout syndrome on their list of occupational diseases. Denmark, France, Latvia, Portugal, and Sweden all have awarded compensation for burnout syndrome, setting a precedent on how burnout is viewed (Lastovkova et al., 2018). Furthermore, the National Academy of Medicine (2020) made clinicians' wellbeing a priority, and burnout is included in the 10th revision of the International Classification of Diseases. These movements indicate potential changes in how organizations and employers perceive and manage burnout. Since the Occupational Safety and Health Act of 1970, employers and employees have been obliged to keep working conditions safe and free of known hazards. Historically, organizations have focused on preventing mortality and morbidity; but as the profound adverse con-

sequences of stress and stress-related phenomena receive more attention, a majority of the U.S. employers are now offering their employees wellness programs (Mattke et al., 2013; Caloyeras et al., 2014).

The majority of these wellness programs are individual-focused, such as cognitive-behavior strategies, resilience training, stress management, and mindfulness programs (Lee et al., 2016; Jarden et al., 2019). And while these individual-focused programs have demonstrated positive efficacy, personal and organizational efforts are also necessary to begin addressing the dynamics of burnout and to provide systemic and sustainable change. In a review of interventions to reduce physician burnout, it was both individual-focused (e.g., mindfulness practice) and structural and organizational strategies (e.g., reduction in duty hour requirements and inpatient rotations) that were required to result in a clinically meaningful reduction (West et al., 2016). In another review, while 80% of interventions used with healthcare professionals led to a reduction in burnout, the comprehensive interventions targeting both individuals (e.g., cognitive behavior training) and organizations (communication workshop, management skill training) had longer-lasting effects for 12 months or more (Awa et al., 2010). Thus, it is imperative that the efforts to reduce burnout in clinical settings must be multi-prong approaches at the individual, group, and organizational levels.

4.1. Implications

In more practical sense, addressing nurse burnout has become urgent during the COVID-19 pandemic. Important first step organizations can take is open recognition and frank discussion on the negative effects of burnout on its employees and organization as a means to reduce stigma. Appointing a wellness officer at an administrative level to focus on clinician wellbeing, create a policy and to offer resources dedicated to self-care and mental health for those in need (Kishore et al., 2018) is one way that organizations could demonstrate their commitment to combating burnout and raising the awareness and visibility of this important issue. Creating a healthy and safe work environment requires redesigning workflow, reconceiving the role of electronic medical records, and addressing and mandating safe and effective nurse staffing (NAM, 2020); but such an environment is predicated, more than anything else, on supportive relationships between nurses and the organizations where they work, relationships that affirm a culture of wellbeing.

Furthermore, team or nursing-unit based interventions to leverage the relational aspect of the nursing profession should be considered. Negative emotions like burnout can be easily shared among those in proximity (Barsade, 2002). This burnout contagion may be exacerbated in caring professions such as nursing, which is deeply rooted in human connection and working in close proximity during each shift (Bakker et al., 2006; Jun and Costa, 2020). Therefore, team-based interventions, such as debriefing, a social support network, storytelling, and group stress management sessions, should be a part of the multi-prong approach (Jun and Costa, 2020; Le Blanc et al., 2007). Nurses have relied on peer support to cope with stress (de Oliveira et al. 2019) and team-based interventions can potentially enhance nurses' collective resilience (West et al., 2009).

Lastly, this review adds to the growing body of literature that calls for increased rigor and conceptual clarity in burnout studies. The current literature on nurse burnout and its association to patient outcomes is dominantly based on cross-sectional studies with local samples without a clear theoretical approach using inconsistent burnout measures (Dall'Orta et al., 2020). In order to fully understand and engage in reducing burnout, longitudinal data collection using a reliable and validated standardized measurement is

a must to ensure that burnout and its consequences are fully addressed over time.

4.2. Limitations

There are several limitations to this systematic review. First, while we focused on nurse burnout, there are other terms that could describe similar occupational distress. “compassion fatigue,” “secondary trauma,” “moral injury” or “moral distress,” and “chronic occupational stress” are all terms that could, as well, describe the challenges facing nurses today. Limiting the search term to *burnout* may have excluded other studies that examined how such related conditions affect outcomes. That said, we felt that including synonymous constructions would create too much heterogeneity, inhibiting our ability to provide an effective and efficient review of the state of the science. Second, we included only those studies that were peer-reviewed and written and published in English, thus potentially introducing publication bias. Furthermore, studies included in this review were observational designs with no theoretical underpinning, had small effect sizes using self-reported measures, thereby limiting the generalizability of the findings. A heterogeneous sample of countries could invite the problem of burnout being perceived differently in various cultural contexts. Lastly, the cross-sectional design of the studies accounted only for an association, stopping short of establishing causation between burnout and outcomes.

Conclusion

Nurse burnout is a severe occupational hazard affecting nurses, patients, organizations, and society at large. This review adds to the existing literature examining the negative associations between nurse burnout, patient safety, quality of care, patient experiences, nurses' commitment to their organizations, and practitioner productivity. Framing burnout as an organizational phenomenon, rather than as an individual issue, affords the broader perspective necessary to assess and address this crisis. Furthermore, implementing organizational strategies and policies for preventing and managing nurse burnout requires a comprehensive conceptual mapping of burnout and its associated consequences, with attention to organization-level interventions in hospitals.

Declaration of Competing Interest

All authors declare no conflict of interest.

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References

- Adriaenssens, J., De Gucht, V., Maes, S., 2015. Determinants and prevalence of burnout in emergency nurses: a systematic review of 25 years of research. *Int. J. Nurs. Stud.* 52 (2), 649–661. doi:10.1016/j.ijnurstu.2014.11.004.
- Alves, D.F.S., Guirardello, E.B., 2016. Safety climate, emotional exhaustion and job satisfaction among Brazilian paediatric professional nurses. *Int. Nurs. Rev.* 63 (3), 328–335. doi:10.1111/inr.12276.
- Awa, W.L., Plaumann, M., Walter, U., 2010. Burnout prevention: a review of intervention programs. *Patient Educ. Couns.* 78 (2), 184–190. doi:10.1016/j.pec.2009.04.008.
- Barsade, S.G., 2002. The ripple effect: emotional contagion and its influence on group behavior. *Adm. Sci. Q.* 47 (4), 644–675. doi:10.2307/3094912.
- Brewer, C.S., Kovner, C.T., Greene, W., Tukov-Shuser, M., Djukic, M., 2012. Predictors of actual turnover in a national sample of newly licensed registered nurses employed in hospitals. *J. Adv. Nurs.* 68 (3), 521–538. doi:10.1111/j.1365-2648.2011.05753.x.
- Caloyeras, J.P., Liu, H., Exum, E., Broderick, M., Mattke, S., 2014. Managing manifest diseases, but not health risks, saved PepsiCo money over seven years. *Health Aff.* 33 (1), 124–131. doi:10.1377/hlthaff.2013.0625.
- Chang, H.Y., Friesner, D., Chu, T.L., Huang, T.L., Liao, Y.N., Teng, C.I., 2018. The impact of burnout on self-efficacy, outcome expectations, career interest and nurse turnover. *J. Adv. Nurs.* 74 (11), 2555–2565. doi:10.1111/jan.13776.
- Chang, H.Y., Shyu, Y.L., Wong, M.K., Chu, T.L., Lo, Y.Y., Teng, C.I., 2017. How does burnout impact the three components of nursing professional commitment? *Scand. J. Caring Sci.* 31 (4), 1003–1011. doi:10.1111/scs.12425.
- Chao, M., Shih, C.T., Hsu, S.F., 2016. Nurse occupational burnout and patient-rated quality of care: the boundary conditions of emotional intelligence and demographic profiles. *Jpn. J. Nurs. Sci.* 13 (1), 156–165. doi:10.1111/jjns.12100.
- Cho, S.H., Lee, J.Y., Mark, B.A., Yun, S.C., 2012. Turnover of new graduate nurses in their first job using survival analysis. *J. Nurs. Scholarsh.* 44 (1), 63–70. doi:10.1111/j.1547-5069.2011.01428.x.
- Cimiotti, J.P., Aiken, L.H., Sloane, D.M., Wu, E.S., 2012. Nurse staffing, burnout, and health care-associated infection. *Am. J. Infect. Control* 40 (6), 486–490. doi:10.1016/j.ajic.2012.02.029.
- Colindres, C.V., Bryce, E., Coral-Rosero, P., Ramos-Soto, R.M., Bonilla, F., Yassi, A., 2018. Effect of effort-reward imbalance and burnout on infection control among Ecuadorian nurses. *Int. Nurs. Rev.* 65 (2), 190–199. doi:10.1111/inr.12409.
- Critical Assessment Skills Programme. CASP Cohort Study Checklist 2018; https://casp-uk.net/wp-content/uploads/2018/03/CASP-Cohort-Study-Checklist-2018_fillable_form.pdf.
- Chuang, C.H., Tseng, P.C., Lin, C.Y., Lin, K.H., Chen, Y.Y., 2016. Burnout in the intensive care unit professionals: a systematic review. *Medicine (Baltimore)* 95 (50), e5629. doi:10.1097/MD.00000000000005629.
- Dall’Ora, C., Ball, J., Reinius, M., Griffiths, P., 2020. Burnout in nursing: a theoretical review. *Hum. Resour. Health* 18 (1), 41. doi:10.1186/s12960-020-00469-9.
- de Lima Garcia, C., Bezerra, I., Ramos, J., do Valle, J., Bezerra de Oliveira, M.L., Abreu, L.C., 2019. Association between culture of patient safety and burnout in pediatric hospitals. *PLoS ONE* 14 (6), e0218756. doi:10.1371/journal.pone.0218756.
- de Oliveira, S.M., de Alcantara Sousa, L.V., Vieira Gadelha, M., do S., do Nascimento, V.B., 2019. Prevention actions of burnout syndrome in nurses: an integrating literature review. *Clin. Pract. Epidemiol. Ment. Health* 15 (1), 64–73. doi:10.2174/1745017901915010064.
- Dewa, C.S., Loong, D., Bonato, S., Trojanowski, L., 2017. The relationship between physician burnout and quality of healthcare in terms of safety and acceptability: a systematic review. *BMJ Open* 7 (6), e015141. doi:10.1136/bmjopen-2016-015141.
- Dewanto, A., Wardhani, V., 2018. Nurse turnover and perceived causes and consequences: a preliminary study at private hospitals in Indonesia. *BMC Nurs.* 17 (Suppl 2), 52. doi:10.1186/s12912-018-0317-8.
- Garcia, C.L., Abreu, L.C., Ramos, J., Castro, C., Smiderle, F., Santos, J., Bezerra, I., 2019. Influence of burnout on patient safety: systematic review and meta-analysis. *Medicina (B. Aires)*. 55 (9), 553. doi:10.3390/medicina55090553.
- Galletta, M., Portoghese, I., D’Aloja, E., Mereu, A., Contu, P., Coppola, R.C., Finco, G., Campagna, M., 2016. Relationship between job burnout, psychosocial factors and health care-associated infections in critical care units. *Intens. Crit. Care Nurs.* 34, 51–58. doi:10.1016/j.iccn.2015.11.004.
- Grant, M.J., Booth, A., 2009. A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Info. Libr. J.* 26 (2), 91–108. doi:10.1111/j.1471-1842.2009.00848.x.
- Goh, J., Pfeffer, J., Zenios, S.A., 2016. The relationship between workplace stressors and mortality and health costs in the United States. *Manag. Sci.* 62 (2), 608–628. doi:10.1287/mnsc.2014.2115.
- Halbesleben, J.R., Rathert, C., Williams, E.S., 2013. Emotional exhaustion and medication administration work-arounds: the moderating role of nurse satisfaction with medication administration. *Health Care Manag. Rev.* 38 (2), 95–104. doi:10.1097/HMR.0b013e3182452c7f.
- Halbesleben, J.R., Wakefield, B.J., Wakefield, D.S., Cooper, L.B., 2008. Nurse burnout and patient safety outcomes: nurse safety perception versus reporting behavior. *West. J. Nurs. Res.* 30 (5), 560–577. doi:10.1177/0193945907311322.
- Hall, L.H., Johnson, J., Watt, I., Tsipa, A., O’Connor, D.B., 2016. Healthcare staff well-being, burnout, and patient safety: a systematic review. *PLoS ONE* 11 (7), e0159015. doi:10.1371/journal.pone.0159015.
- Han, S., Shanafelt, T.D., Sinsky, C.A., Awad, K.M., Dyrbye, L.N., Fiscus, L.C., Trockel, M., Goh, J., 2019. Estimating the attributable cost of physician burnout in the United States. *Ann. Intern. Med.* 170 (11), 784–790. doi:10.7326/M18-1422.

- Hayes, L.J., O'Brien-Pallas, L., Duffield, C., Shamian, J., Buchan, J., Hughes, F., Laschinger, H.K., North, N., 2012. Nurse turnover: a literature review - an update. *Int. J. Nurs. Stud.* 49 (7), 887–905. doi:10.1016/j.ijnurstu.2011.10.001.
- Health Resources & Services Administration. Nursing workforce survey data. Website <https://data.hrsa.gov/topics/health-workforce/nursing-workforce-survey-data>. Accessed March 1, 2020.
- Jarden, R.J., Sandham, M., Siegert, R.J., Koziol-McLain, J., 2019. Strengthening workplace well-being: perceptions of intensive care nurses. *Nurs. Crit. Care* 24 (1), 15–23. doi:10.1111/nicc.12386.
- Jones, C.B., Gates, M., 2007. The costs and benefits of nurse turnover: a business case for nurse retention. *Online J. Issues Nurs.* 12 (3), 4. doi:10.3912/OJIN.Vol12No03Man04.
- Jones, C.B., 2004. The costs of nurse turnover: part 1: an economic perspective. *J. Nurs. Adm.* 34 (12), 562–570. doi:10.1097/00005110-200412000-00006.
- Jun, J., Costa, D.K., 2020. Is it me or you? A team approach to mitigate burnout in critical care. *Crit. Care Nurs. Clin.* 32 (3), 395–406. doi:10.1016/j.cnc.2020.05.003.
- Khamisa, N., Peltzer, K., Oldenburg, B., 2013. Burnout in relation to specific contributing factors and health outcomes among nurses: a systematic review. *Int. J. Environ. Res. Public Health* 10 (6), 2214–2240. doi:10.3390/ijerph10062214.
- Kieft, R.A., de Brouwer, B.B., Francke, A.L., Delnoij, D.M., 2014. How nurses and their work environment affect patient experiences of the quality of care: a qualitative study. *BMC Health Serv. Res.* 14, 249. doi:10.1186/1472-6963-14-249.
- Kishore, S., Ripp, J., Shanafelt, T., Melnyk, B., Rogers, D., Spisso, J., 2018. Making the case for the chief wellness officer in America's health systems: a call to action. *Health Affairs Blog*. Oct 26 <https://www.healthaffairs.org/doi/10.1377/hblog20181025.308059/full>.
- Kovner, C.T., Brewer, C.S., Fatehi, F., Jun, J., 2014. What does nurse turnover rate mean and what is the rate? *Policy, Polit. Nurs. Pract.* 15 (3–4), 64–71. doi:10.1177/1527154414547953.
- Laschinger, H.K., Grau, A.L., Finegan, J., Wilk, P., 2012. Predictors of new graduate nurses' workplace well-being: testing the job demands-resources model. *Health Care Manag. Rev.* 37 (2), 175–186. doi:10.1097/HMR.0b013e31822aa456.
- Lastovkova, A., Carder, M., Rasmussen, H.M., Sjoberg, L., Groene, G.J., Sauni, R., Vevoda, J., Vevodova, S., Lasfargues, G., Svartengren, M., Varga, M., Colosio, C., Pelclova, D., 2018. Burnout syndrome as an occupational disease in the European Union: an exploratory study. *Ind. Health* 56 (2), 160–165. doi:10.2486/indhealth.2017-0132.
- Lee, H.F., Kuo, C.C., Chien, T.W., Wang, Y.R., 2016. A meta-analysis of the effects of coping strategies on reducing nurse burnout. *Appl. Nurs. Res.* 31, 100–110. doi:10.1016/j.apnr.2016.01.001.
- Leiter, M.P., Maslach, C., 2009. Nurse turnover: the mediating role of burnout. *J. Nurs. Manage.* 17 (3), 331–339. doi:10.1111/j.1365-2834.2009.01004.x.
- Leiter, M.P., Harvie, P., Frizzell, C., 1998. The correspondence of patient satisfaction and nurse burnout. *Soc. Sci. Med.* 47 (10), 1611–1617. doi:10.1016/S0277-9536(98)00207-x.
- Liu, X., Zheng, J., Liu, K., Baggs, J.G., Liu, J., Wu, Y., You, L., 2018. Hospital nursing organizational factors, nursing care left undone, and nurse burnout as predictors of patient safety: a structural equation modeling analysis. *Int. J. Nurs. Stud.* 86, 82–89. doi:10.1016/j.ijnurstu.2018.05.005.
- Marques-Pinto, A., Jesus, É.H., Mendes, A., Fronteira, I., Roberto, M.S., 2018. Nurses' intention to leave the organization: a mediation study of professional burnout and engagement. *Span. J. Psychol.* 21, E32. doi:10.1017/sjp.2018.30.
- Maslach, C., Leiter, M.P., 2016. Burnout. In: Fink, G. (Ed.), *Handbook of stress: Vol. 1. Stress: Concepts, cognition, emotion, and Behavior*. Elsevier Academic Press, pp. 351–357.
- Mattke, S., Liu, H., Caloyeras, J., Huang, C.Y., Van Busum, K.R., Khodyakov, D., Shier, V., 2013. Workplace wellness programs study. *Rand. Health Q.* 3 (2). Retrieved from https://www.rand.org/pubs/research_reports/RR254.html.
- McNair, N., Baird, J., Grogan, T.R., Walsh, C.M., Liang, L.J., Worobel-Luk, P., Needleman, J., Nuckols, T.K., 2016. Is spending more time associated with less missed care?: a comparison of time use and missed care across 15 nursing units at 2 hospitals. *J. Nurs. Adm.* 46 (9), 428–437. doi:10.1097/NNA.0000000000000371.
- McHugh, M.D., Kutney-Lee, A., Cimiotti, J.P., Sloane, D.M., Aiken, L.H., 2011. Nurses' widespread job dissatisfaction, burnout, and frustration with health benefits signal problems for patient care. *Health Aff.* 30 (2), 202–210. doi:10.1377/hlthaff.2010.0100.
- Meerpohl, J.J., Herrle, F., Reinders, S., Antes, G., von Elm, E., 2012. Scientific value of systematic reviews: survey of editors of core clinical journals. *PLoS ONE* 7 (5), e35732. doi:10.1371/journal.pone.0035732.
- Mitchell, P.H., Ferketich, S., Jennings, B.M., 1998. Quality health outcomes model. American academy of nursing expert panel on quality health care. *J. Nurs. Scholarsh.* 30 (1), 43–46. doi:10.1111/j.1547-5069.1998.tb01234.x.
- Monsalve-Reyes, C.S., Luis-Costas, San, C., Gómez-Urquiza, L., J., Albendín-García, L., Aguayo, R., Cañadas-De la Fuente, G.A., 2018. Burnout syndrome and its prevalence in primary care nursing: a systematic review and meta-analysis. *BMC Fam. Pract.* 19 (1), 59. doi:10.1186/s12875-018-0748-z.
- Nantsupawat, A., Nantsupawat, R., Kunaviktikul, W., Turale, S., Poghosyan, L., 2016. Nurse burnout, nurse-reported quality of care, and patient outcomes in Thai hospitals. *J. Nurs. Scholarsh.* 48, 83–90. doi:10.1111/jnu.12187.
- National Academy of Sciences, Engineering, and Medicine, 2019. Taking Action Against Clinician Burnout: a Systems Approach to Professional Well-Being. The National Academies Press, Washington, DC Chapter 2 & 3 <https://www.nap.edu/read/25521/chapter/2#3> doi:10.17226/25521.
- Nayeri, N.D., Negarandeh, R., Vaismoradi, M., Ahmadi, F., Faghizadeh, S., 2009. Burnout and productivity among Iranian nurses. *Nurs. Health Sci.* 11 (3), 263–270. doi:10.1111/j.1442-2018.2009.00449.x.
- Nursing Solutions, Inc. 2020. NSI National healthcare retention & RN staffing report. https://www.nsinursingsolutions.com/Documents/Library/NSI_National_Health_Care_Retention_Report.pdf. Published March 2020. Accessed March 15, 2020.
- Parker, P.A., Kulik, J.A., 1995. Burnout, self- and supervisor-rated job performance, and absenteeism among nurses. *J. Behav. Med.* 18 (6), 581–599. doi:10.1007/BF01857897.
- Poghosyan, L., Clarke, S.P., Finlayson, M., Aiken, L.H., 2010. Nurse burnout and quality of care: cross-national investigation in six countries. *Res. Nurs. Health* 33 (4), 288–298. doi:10.1002/nur.20383.
- Purvanova, R.K., Muros, J.P., 2010. Gender differences in burnout: a meta-analysis. *J. Vocat. Behav.* 77 (2), 168–185. doi:10.1016/j.jvb.2010.04.006.
- Salvagioni, D., Melanda, F.N., Mesas, A.E., González, A.D., Gabani, F.L., Andrade, S.M., 2017. Physical, psychological and occupational consequences of job burnout: a systematic review of prospective studies. *PLoS ONE* 12 (10), e0185781. doi:10.1371/journal.pone.0185781.
- Stalpers, D., de Brouwer, B.J., Kaljouw, M.J., Schuurmans, M.J., 2015. 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.* 52 (4), 817–835. doi:10.1016/j.ijnurstu.2015.01.005.
- Van Bogaert, P., Clarke, S., Roelant, E., Meulemans, H., Van de Heyning, P., 2010. Impacts of unit-level nurse practice environment and burnout on nurse-reported outcomes: a multilevel modelling approach. *J. Clin. Nurs.* 19 (11–12), 1664–1674. doi:10.1111/j.1365-2702.2009.03128.x.
- Van Bogaert, P., Clarke, S., Willems, R., Mondelaers, M., 2013. Nurse practice environment, workload, burnout, job outcomes, and quality of care in psychiatric hospitals: a structural equation model approach. *J. Adv. Nurs.* 69 (7), 1515–1524. doi:10.1111/jan.12010.
- Van Bogaert, P., Meulemans, H., Clarke, S., Vermeyen, K., Van de Heyning, P., 2009. Hospital nurse practice environment, burnout, job outcomes and quality of care: test of a structural equation model. *J. Adv. Nurs.* 65 (10), 2175–2185. doi:10.1111/j.1365-2648.2009.05082.x.
- Van Bogaert, P., Timmermans, O., Weeks, S.M., van Heusden, D., Wouters, K., Franck, E., 2014. Nursing unit teams matter: impact of unit-level nurse practice environment, nurse work characteristics, and burnout on nurse reported job outcomes, and quality of care, and patient adverse events—a cross-sectional survey. *Int. J. Nurs. Stud.* 51 (8), 1123–1134. doi:10.1016/j.ijnurstu.2013.12.009.
- Wang, S., Liu, Y., Wang, L., 2015. Nurse burnout: personal and environmental factors as predictors. *Int. J. Nurs. Pract.* 21 (1), 78–86. doi:10.1111/ijn.12216.
- Welp, A., Meier, L.L., Manser, T., 2015. Emotional exhaustion and workload predict clinician-rated and objective patient safety. *Front. Psychol.* 5, 1573. doi:10.3389/fpsyg.2014.01573.
- West, C.P., Dyrbye, L.N., Erwin, P.J., Shanafelt, T.D., 2016. Interventions to prevent and reduce physician burnout: a systematic review and meta-analysis. *Lancet* 388 (10057), 2272–2281. doi:10.1016/S0140-6736(16)31279-X.
- Woo, T., Ho, R., Tang, A., Tam, W., 2020. Global prevalence of burnout symptoms among nurses: a systematic review and meta-analysis. *J. Psychiatr. Res.* 123, 9–20. doi:10.1016/j.jpsychires.2019.12.015.