

Original Article

## Nurses Work Environment and Patients' Quality of Care

**Ioannis Moisoglou, RN, MSc, PhD**

Department of Quality Control, Research and Continuing Education, General Hospital of Lamia, Lamia, Greece

**Aris Yfantis, RN, MSc, PhD (c)**

Department of Quality Control, Research and Continuing Education, General Hospital of Lamia, Lamia, Greece

**Petros Galanis, RN, MPH, PhD**

Center for Health Services Management and Evaluation, Faculty of Nursing, National and Kapodistrian University of Athens, Athens, Greece

**Aikaterini Pispirigou, RN, MSc**

Nurse Manager of the Orthopaedic Unit, General Hospital of Lamia, Lamia, Greece

**Evangelos Chatzimargaritis, MSc**

Manager of the General Hospital of Lamia, Lamia, Greece

**Athina Theoxari, RN, MSc, PhD (c)**

ICU, University Hospital of Larisa, Larisa, Greece

**Panagiotis Prezerakos, MSc, PhD**

Professor, Faculty of Nursing, University of Peloponnese, Tripoli, Greece

**Correspondence:** Ioannis Moisoglou: Strogylakou 10, 35100, Lamia, Greece E-mail: giannismois@gmail.com

### Abstract

**Background:** Nurses' work environment has been recognized as a crucial variable for the provision of quality healthcare services.

**Aims:** The aim of the study was to assess the work environment of the nurses and investigate the relation between the work environment and selected patients' safety indicators.

**Methodology:** A cross-sectional study was conducted and a convenience sample of 520 nurses, from five public general hospitals of a Regional Health Authority, were recruited to participate in the study. Four hundred thirty two completed questionnaires were collected and analyzed (response rate 83.07%).

**Results:** Participants scored collegial nurse – physician relations (Mean = 2.74, SD = 0.47) as the most favorable characteristic of their work environment and nurse manager ability, leadership and support of nurses (Mean = 2.60, SD = 0.59) as the next most favorable. The overall PES-NWI scored < 2.5 (Mean = 2.44, SD = 0.38) indicating a non - favorable nurses workplace. Regarding the patient safety indicators, the catheter-associated infection was the most frequently reported indicator by the nurses, as 51.6% reported it as frequent/very frequent and the next most frequent indicator was pressure ulcers, as 40.3% of the participants reported it as frequent/very frequent. Nurses that stated medication error as frequent/very frequent safety indicator scored lower nurse manager ability, leadership and support of nurses, and collegial nurse-physician relations (p=0.044 and p=0.031 respectively).

**Conclusions:** The study revealed that nurses work in a non – favorable work environment.

Hospital and nurse managers have to work together for the improvement of nurses' work environment, as it is a prerequisite for the provision of quality and safety patient care.

**Key Words:** Hospital, nurse, quality, safety, work environment..

## Introduction

Nurses' work environment consists of an important factor that affects both themselves and the quality of nursing care provided. The characteristics of Magnet Hospitals, that summarized in nursing management and leadership, nurses' degree of autonomy, staffing, opportunities for promotion, implementation of care models, and professional development through education, contribute to the better quality of health services provided (Friese, Xia, Ghafer, Birkmeyer, & Banerjee, 2015; McClure & Hinshaw, 2002; Stimpfel, Sloane, McHugh, & Aiken, 2016). Also, The American Association of Critical-Care Nurses (American Association of Critical-Care Nurses, 2005) published a work, where presented the six characteristics for creating and maintaining a healthy work environment for nurses, which contributes to providing the best possible care to patients. These characteristics were the skilled communication, true collaboration, effective decision making, the appropriate staffing, meaningful recognition and authentic leadership. Though, there is not a common definition of what a healthy work environment is, however all these characteristics are essential for nurses in order to provide patients with quality care.

Hospital administrations internationally are now under constant pressure and striving to improve the quality of healthcare services (Makary and Daniel, 2016; Kohn, Corrigan and Donaldson, 2000). The characteristics of nurses' work environment are predictive factors of the quality of health services provided. Particularly, the transformational leadership affects job satisfaction and patient safety outcomes (Boamah, Spence Laschinger, Wong, & Clarke, 2018). Also, a bedside care workforce with a greater proportion of professional nurses is associated with better outcomes and a patient's length of stay (Aiken et al., 2017; Moisoglou et al., 2019).

The working environment also affects the nursing staff. Studies have linked the characteristics of nurses' work environment to the appearance of burnout (Liu, You, Zheng, Liu, & Liu, 2019), major depressive episodes, absenteeism and nurses intention to leave their work (Enns, Currie and Wang, 2015; Mudaly and Nkosi, 2015; Burmeister *et al.*, 2019).

Nurses and doctors are frontline health care professionals that provide the majority of care that receive patients during hospitalization. Communication and collaboration between them is crucial, as it can affect the quality of care, patient safety, as well as the satisfaction of nursing staff and their desire to leave work (Al-Hamdan, Banerjee, & Manojlovich, 2018; Boev & Xia, 2015; Estabrooks, Midodzi, Cummings, Ricker, & Giovannetti, 2005).

The special features that make up the work environment, as well as its multidimensional role, make it imperative to study these characteristics and investigate their potential impact on the quality of services provided. Through this investigation, it will be possible for hospital administrations to make the necessary interventions to improve the working environment.

**Aim:** The aim of the study was to assess the work environment of the nurses and investigate the relation between the work environment and selected patients' safety indicators.

## Material and methods

**Design:** A cross-sectional study was conducted and a convenience sample of 520 nurses, from five public general hospitals at a Regional Health Authority, were recruited to participate in the study. Four hundred thirty two completed questionnaires were collected and analyzed (response rate 83.07%).

The questionnaires were sent by a reply-paid post. Each was given in an envelope, accompanied by a letter describing the personal data of researchers, the aim of the study and ethical aspects (anonymity and voluntary participation). Participants returned the questionnaire to the nurse manager of the ward in a sealed envelope. The period during which the study was conducted was from April 1st to July 31st, 2018. The study protocol was approved by the Ethical Committees of the participated hospitals.

**Instruments:** The Practice Environment Scale of the Nursing Work Index (PES-NWI) was used to assess nurses' work environment (Lake, 2002), which has endorsed by the National Quality Forum as a nursing care performance measure (National Quality Forum, 2004). The PES-NWI comprises of 31 items that describe organization characteristics common to Magnet Hospitals.

The items were divided into five subscales: nurses' participation in hospital affairs, nursing foundations for quality of care, nurse manager ability-leadership-support of nurses, staffing and resource adequacy, and collegial nurse-physician relations. These subscales provide the profile of key structures in the nursing work environment, according to the Magnet Hospitals.

A 4-point Likert scale (strongly disagree, disagree, agree, strongly agree) was used to rate the extent to which the items are present in participants' current job. Nurses could rate each item on a scale of 1–4. Higher scores indicate more agreement that the subscale items are present in the current job. Values above mean 2.5 indicate agreement, and values below mean 2.5 indicate disagreement. The Greek translated version was used (Prezerakos, Galanis, & Moisoglou, 2015). Cronbach's alpha for the subscales in the present ranged from 0.60 to 0.85 (nurse participation in hospital affairs=0.83, nursing foundations for quality of care=0.79, nurse manager ability, leadership, and support of nurses=0.85, staffing and resource adequacy=0.75, collegial nurse-physician relations=0.6), and for the PES-NWI was 0.92, indicating very good reliability.

The selected patient safety indicators were the catheter-associated infection, patient fall, medication error, deep venous thrombosis and pressure ulcer. Nurses were asked to report on a 4-point Likert scale (never, rarely, frequently and very frequently) how often the indicators have occurred in their working unit under the nursing care during the previous 3 months.

### Data analysis

Continuous variables are expressed as mean, standard deviation, median, minimum and maximum value, while categorical variables as numbers and percentages. Kolmogorov-Smirnov criterion ( $P > 0.05$  for all variables) and normal probability plots were used to test the normality assumption. Scores on PES-NWI and subscales followed the normal distribution. Comparisons between scores on PES-NWI and subscales and patient safety outcomes were performed with independent samples t-test. All tests of statistical significance were two-tailed, and p-values of less than 0.05 were considered significant. Statistical analysis was performed using the Statistical Package for Social Sciences software (IBM Corp. Released 2012. IBM SPSS Statistics for

Windows, Version 21.0. Armonk, NY: IBM Corp.).

## Results

### Study sample

The majority of the participants were female registered nurses and working in medical wards. The demographic characteristics of the participants are presented in Table 1.

### Nurses work environment

Nurses scored three subscales above mean 2.5 and two subscales below. Particularly, participants scored collegial nurse – physician relations (Mean = 2.74, SD = 0.47) as the most favorable characteristic of their work environment and nurse manager ability, leadership and support of nurses (Mean = 2.60, SD = 0.59) as the next most favorable. The overall PES-NWI scored  $< 2.5$  (Mean = 2.44, SD = 0.38) indicating a non - favorable nurses workplace. Descriptive statistics for The Practice Environment Scale of the Nursing Work Index are presented in Table 2.

### Patient safety indicators

Regarding the patient safety indicators, the catheter-associated infection was the most frequently reported indicator by the nurses, as 51.6% reported it as frequent/very frequent during the last 3 months and the next most frequent indicator was pressure ulcers, as 40.3% of the participants reported it as frequent/very frequent. Patient safety indicators frequency during the last three months are presented in Table 3.

### Associations between work environment and patient safety indicators

Relations between PES-NWI scores and patient safety indicators frequency are presented in Table 4. Mean PES-NWI score was higher among nurses that stated that ulcers and deep venous thrombosis were frequent/very frequent ( $p=0.007$  in both cases). Regarding subscales, nurses that stated patients fall, medication error, deep venous thrombosis and ulcers as frequent/very frequent safety indicators scored higher nurse participation in hospital affairs ( $p=0.012$ ,  $p=0.036$ ,  $p=0.001$  and  $p=0.001$  respectively). Also, nurses that stated patients fall, medication error, deep venous thrombosis and ulcers as frequent/very frequent safety indicator scored higher staffing and resource

adequacy ( $p=0.02$ ,  $p=0.012$ ,  $p<0.001$  and  $p<0.001$  respectively), while nurses that stated deep venous thrombosis and ulcers as frequent/very frequent safety indicator scored higher nursing foundations for quality of care ( $p=0.014$  in both cases). In contrast, nurses that

stated medication error as frequent/very frequent safety indicator scored lower nurse manager ability, leadership, and support of nurses and collegial nurse-physician relations ( $p=0.044$  and  $p=0.031$  respectively).

**Table 1. Demographic characteristics of the participants (n=432).**

Characteristic	N	%
Gender		
Male	41	9.5
Female	391	90.5
Age	41.4 <sup>a</sup>	6.6 <sup>b</sup>
Years of experience	15.5 <sup>a</sup>	6.9 <sup>b</sup>
Workplace		
General ward	171	39.6
Surgical ward	111	25.7
Units	150	34.7
Profession		
Registered nurse	313	72.8
Assistant nurse	117	27.2
Master/PhD degree		
No	394	91.8
Yes	35	8.2
Continuous education		
Yes	211	49.2
No	218	50.8
Seminars during last year		
Yes	219	50.7
No	213	49.3
Journal subscriber		
Yes	96	22.2
No	336	77.8

<sup>a</sup> mean <sup>b</sup> standard deviation

**Table 2. Descriptive statistics for The Practice Environment Scale of the Nursing Work Index.**

Scale	Mean	Standard deviation	Median	Minimum value	Maximum value
Nurse participation in hospital affairs	2.33	0.50	2.33	1	4
Nursing foundations for quality of care	2.35	0.44	2.40	1	3.8
Nurse manager ability, leadership, and support of nurses	2.60	0.59	2.60	1	4
Staffing and resource adequacy	2.16	0.57	2.25	1	3.75
Collegial nurse-physician relations	2.74	0.47	3	1	4
PES-NWI	2.44	0.38	2.45	1.38	3.66

**Table 3. Patient safety indicators frequency during the last three months.**

Event/error	Never (0 times)	Rarely (one time)	Frequently (2-3 times)	Very frequently (>3 times)
Catheter-associated infection	110 (25.5)	99 (22.9)	154 (35.6)	69 (16.0)
Patient fall	257 (59.5)	90 (20.8)	76 (17.6)	9 (2.1)
Medication error	309 (71.5)	57 (13.2)	58 (13.5)	8 (1.9)
Deep venous thrombosis	266 (61.6)	97 (22.5)	64 (14.8)	5 (1.2)
Ulcer	166 (38.4)	92 (21.3)	109 (25.7)	63 (14.6)

Values are expressed as n (%).

**Table 4. Relations between PES-NWI scores and patient safety indicators frequency.**

	Never/rarely	Frequently/very frequently	P-value <sup>a</sup>
<b>Catheter-associated infection</b>			
Nurse participation in hospital affairs	2.31 (0.54)	2.35 (0.45)	0.42
Nursing foundations for quality of care	2.38 (0.44)	2.33 (0.44)	0.20
Nurse manager ability, leadership, and support of nurses	2.59 (0.65)	2.61 (0.54)	0.86
Staffing and resource adequacy	2.16 (0.55)	2.17 (0.59)	0.89
Collegial nurse-physician relations	2.77 (0.45)	2.72 (0.48)	0.29
PES-NWI	2.44 (0.41)	2.43 (0.36)	0.81
<b>Patients fall</b>			
Nurse participation in hospital affairs	2.30 (0.51)	2.45 (0.46)	<b>0.012</b>
Nursing foundations for quality of care	2.35 (0.44)	2.38 (0.47)	0.57
Nurse manager ability, leadership, and support of	2.60 (0.61)	2.62 (0.52)	0.80

nurses			
Staffing and resource adequacy	2.13 (0.55)	2.29 (0.61)	<b>0.02</b>
Collegial nurse-physician relations	2.75 (0.45)	2.69 (0.52)	0.35
PES-NWI	2.42 (0.38)	2.48 (0.39)	0.19
<b>Medication error</b>			
Nurse participation in hospital affairs	2.30 (0.51)	2.45 (0.45)	<b>0.036</b>
Nursing foundations for quality of care	2.36 (0.43)	2.31 (0.49)	0.40
Nurse manager ability, leadership, and support of	2.62 (0.61)	2.48 (0.50)	<b>0.044</b>
nurses			
Staffing and resource adequacy	2.13 (0.56)	2.32 (0.56)	<b>0.012</b>
Collegial nurse-physician relations	2.76 (0.46)	2.63 (0.48)	<b>0.031</b>
PES-NWI	2.44 (0.38)	2.44 (0.39)	0.98
<b>Deep venous thrombosis</b>			
Nurse participation in hospital affairs	2.29 (0.50)	2.52 (0.44)	<b>0.001</b>
Nursing foundations for quality of care	2.33 (0.44)	2.47 (0.43)	<b>0.014</b>
Nurse manager ability, leadership, and support of	2.59 (0.61)	2.68 (0.51)	0.22
nurses			
Staffing and resource adequacy	2.12 (0.56)	2.41 (0.54)	<b>&lt;0.001</b>
Collegial nurse-physician relations	2.76 (0.46)	2.68 (0.51)	0.21
PES-NWI	2.42 (0.38)	2.55 (0.37)	<b>0.007</b>
<b>Ulcers</b>			
Nurse participation in hospital affairs	2.29 (0.53)	2.38 (0.45)	<b>0.001</b>
Nursing foundations for quality of care	2.33 (0.44)	2.47 (0.43)	<b>0.014</b>
Nurse manager ability, leadership, and support of	2.59 (0.61)	2.68 (0.51)	0.22
nurses			
Staffing and resource adequacy	2.12 (0.56)	2.41 (0.54)	<b>&lt;0.001</b>
Collegial nurse-physician relations	2.76 (0.46)	2.68 (0.51)	0.21
PES-NWI	2.42 (0.38)	2.55 (0.37)	<b>0.007</b>

Values are expressed as mean (standard deviation). <sup>a</sup> independent samples t-test

## Discussion

The findings of the present study revealed a non-favorable nurses' workplace. The overall PES-NWI were scored low by the participants, as well as the work environment characteristics staffing and resource adequacy, nursing foundations for quality of care and nurse participation in hospital affairs. These findings are consistent with the

findings of 3 other studies in Greece that assessed nurses' work environment (Brofidi, Vlasidis and Philalithis, 2018; Prezerakos, Galanis and Moisoglou, 2015; Gikopoulou *et al.*, 2014). Particularly, the staffing and resource adequacy subscale was the least favorable in all three studies. Healthcare was one of the sectors that affected most by the financial crisis in Greece. Hospital budgets reduction and staff

cutting were the most significant impact of the economic crisis. Nurses' appointment was stopped and temporary nurses' contracts were not renewed (Kaitelidou & Kouli, 2012), shrinking the nursing staff to such an extent that the patients/ to nurse ratio in Greece to be one of the highest in Europe (Aiken et al., 2012) and affects negative the quality of health care services (Moisoglou et al., 2019). Although there are not available official data, many nurses retired, making use of the incentives that the government gave in order to reduce the civil servant's number.

The nursing staff has been recognized as the most important variable for the provision of quality and safe healthcare services. Hospital acquired infections, falls, pressure ulcers and medication errors are adverse patients events that correlate with nursing staff (Cho *et al.*, 2016; Aiken *et al.*, 2017; Brady, Malone and Fleming, 2009; Lake *et al.*, 2010; Cimiotti *et al.*, 2012; Blegen, Goode and Reed, 1998). According to our findings, nurses stated patients' falls, medication errors, deep venous thrombosis and ulcers as frequent/very frequent safety indicators, although they scored higher staffing and resource adequacy. This finding can be explained by the fact that the overall rating of nursing foundations for quality of care subscale scored as non-favorable (< 2.50). In addition, Greek nurses that participated in a European study (12 countries), assessed the quality of patient care as poor. The percentage of Greek nurses that rated the quality as poor was 47%, the largest among the European nurses. The most frequent adverse events according to that study were pressure ulcers after admission and healthcare associated infections (Aiken et al., 2013).

The nurse manager's ability and leadership and collegial nurse-physician relations are two of the most important variables in the effort of health care organizations to provide quality services. The findings of the present study revealed the correlation between nurse leadership and nurse-physician relations with medication errors. These findings are consistent with the findings of other studies (Flynn, Liang, Dickson, Xie, & Suh, 2012; Vogus & Sutcliffe, 2007). The medicines' administration is among the important and frequent interventions that nurses provide during the patient's hospitalization. Medication errors account for a significant proportion of adverse events (Barker, Flynn, Pepper, Bates, & Mikeal,

2002), with effects on hospitalization costs, length of stay and patient mortality (Classen, Pestotnik, Evans, Lloyd, & Burke, 1997). According to Joint Commission sentinel events' report, medication errors are included among the 10 most frequently reported types of sentinel events ("Quality and safety," 2018) and leadership has recognized as the second most frequently identified root cause contributor for the sentinel events ("Patient safety," 2015). Nurse leadership can create, promote and sustain a patient safety culture, which can contribute to a medication error reduction (Vogus and Sutcliffe, 2007).

According to our findings, the collegial nurse-physician relations was the most favorable element of nurses' work environment. This finding is consistent with findings of other studies in Greece, where the collegial nurse-physician was rated with the highest score (Prezerakos, Galanis and Moisoglou, 2015; Gikopoulou *et al.*, 2014). Also, according to present study findings, nurses that stated medication error as frequent/very frequent safety indicator scored lower collegial nurse-physician relations, revealing the important role of nurse-physician collaboration and communication in patients safety care. The healthcare services provision is teamwork and nurses and doctors do not work isolated. Many studies have shown the multidimensional role that nurse-physician collaboration and communication play, affecting both the patient's care and nurses. Particularly, better nurse-physician relations can lead to better patients' outcomes (Baggs et al., 1999), to medication errors reduction (Manojlovich & DeCicco, 2007), to quality nursing care (Shang, Friese, Wu, & Aiken, 2013) and to the reduction number of patient hospitalizations (Gardner, Thomas-Hawkins, Fogg, & Latham, 2007). Nurses that have good relations with doctors, they state more satisfied with their job and decision making (Baggs *et al.*, 1997; Baggs and Ryan, 1990).

### Limitations

The study has some limitations. Although the study population consisted of a large sample across 5 hospitals in a Regional Health Authority, however, the results have to be interpreted carefully as they relate to a specific region of Greece. The data regarding adverse events was collected through nurses' report as a frequency, while the collection through

administration data and absolute numbers, will be more objective.

### Conclusion and implications for nursing practice

The study revealed that nurses work in a non – favorable work environment. Nurse staffing was the least favorable aspect of the work environment and catheter-associated infections and pressure ulcers reported as the most frequent adverse events. Collegial nurse-physician relations and nurse manager ability, leadership, and support of nurses were the most favorable characteristics of the work environment and correlate with the occurrence of medication errors. Hospital and nurse managers have to work together for the improvement of nurses' work environment, as it is a prerequisite for the provision of quality and safety patient care.

### References

- Aiken, L.H., Sermeus, W., Heede, K. Van Den, Sloane, D., Busse, R., McKee, M., ... Kutney-Lee, A. (2012) Patient safety, satisfaction, and quality of hospital care: cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. *BMJ*, 344(e1717): 1–14.
- Aiken, L.H., Sloane, D., Griffiths, P., Rafferty, A.M., Bruyneel, L., McHugh, M., ... Van Achterberg, T. (2017) Nursing skill mix in European hospitals: Cross-sectional study of the association with mortality, patient ratings, and quality of care. *BMJ Quality and Safety*, 26(7): 559–568.
- Aiken, L.H., Sloane, D.M., Bruyneel, L., Van den Heede, K., Sermeus, W., & RN4CAST Consortium. (2013) Nurses' reports of working conditions and hospital quality of care in 12 countries in Europe. *International Journal of Nursing Studies*, 50(2): 143–153.
- Al-Hamdan, Z., Banerjee, T., & Manojlovich, M. (2018) Communication With Physicians as a Mediator in the Relationship Between the Nursing Work Environment and Select Nurse Outcomes in Jordan. *Journal of Nursing Scholarship*, 50(6): 714–721.
- American Association of Critical-Care Nurses. (2005). *AACN standards for establishing and sustaining healthy work environments: A journey to excellence*. *American Journal of Critical Care* (Vol. 14). Retrieved from [www.aacn.org](http://www.aacn.org)
- Baggs, J.G., & Ryan, S.A. (1990) ICU nurse-physician collaboration & nursing satisfaction. *Nurs Econ*, 8(6): 386–392.
- Baggs, J.G., Schmitt, M.H., Mushlin, A.I., Eldredge, D.H., Oakes, D., & Hutson, A.D. (1997) Nurse-physician collaboration and satisfaction with the decision-making process in three critical care units. *American Journal of Critical Care: An Official Publication, American Association of Critical-Care Nurses*, 6(5): 393–399. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/9283677>
- Baggs, J.G., Schmitt, M.H., Mushlin, A.I., Mitchell, P.H., Eldredge, D.H., Oakes, D., & Hutson, A.D. (1999) Association between nurse-physician collaboration and patient outcomes in three intensive care units. *Critical Care Medicine*, 27(9): 1991–1998.
- Barker, K.N., Flynn, E.A., Pepper, G.A., Bates, D.W., & Mikeal, R. L. (2002) Medication errors observed in 36 health care facilities. *Archives of Internal Medicine*, 162(16): 1897–1903.
- Blegen, M.A., Goode, C.J., & Reed, L. (1998) Nurse Staffing and Patient Outcomes. *Nursing Research*, 47(1): 43–50.
- Boamah, S.A., Spence Laschinger, H.K., Wong, C., & Clarke, S. (2018) Effect of transformational leadership on job satisfaction and patient safety outcomes. *Nursing Outlook*, 66(2): 180–189.
- Boev, C., & Xia, Y. (2015) Nurse-physician collaboration and hospital-acquired infections in critical care. *Critical Care Nurse*, 35(2), 66–72.
- Brady, A.M., Malone, A.M., & Fleming, S. (2009) A literature review of the individual and systems factors that contribute to medication errors in nursing practice. *Journal of Nursing Management*, 17(6): 679–697.
- Brofidi, K., Vlasiadis, K., & Philalithis, A. (2018) Assessment of the nursing practice environment in Greek Hospitals: a cross-sectional study. *Journal of Research in Nursing*, 23(6): 535–545.
- Burmeister, E.A., Kalisch, B.J., Xie, B., Doumit, M.A.A., Lee, E., Ferraresion, A., Bragadóttir, H. (2019) Determinants of nurse absenteeism and intent to leave: An international study. *Journal of Nursing Management*, 27(1): 143–153.
- Cho, E., Lee, N.J., Kim, E.Y., Kim, S., Lee, K., Park, K.O., & Sung, Y.H. (2016) Nurse staffing level and overtime associated with patient safety, quality of care, and care left undone in hospitals: A cross-sectional study. *International Journal of Nursing Studies*, 60: 263–271.
- Cimiotti, J.P., Aiken, L.H., Sloane, D.M., & Wu, E.S. (2012) Nurse staffing, burnout, and health care-associated infection. *American Journal of Infection Control*, 40(6): 486–490.
- Classen, D.C., Pestotnik, S.L., Evans, R.S., Lloyd, J.F., & Burke, J.P. (1997) Adverse drug events in hospitalized patients. Excess length of stay, extra costs, and attributable mortality. *JAMA*, 277(4): 301–306. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/9002492>
- Enns, V., Currie, S., & Wang, J.L. (2015) Professional autonomy and work setting as contributing factors to depression and absenteeism in Canadian nurses. *Nursing Outlook*, 63(3): 269–277.
- Estabrooks, C.A., Midodzi, W.K., Cummings, G.G., Ricker, K.L., & Giovannetti, P. (2005) The impact of hospital nursing characteristics on 30-day mortality. *The Journal of Nursing Administration*, 41(7-8 Suppl): S58-68.
- Flynn, L., Liang, Y., Dickson, G.L., Xie, M., & Suh, D.C. (2012) Nurses' Practice Environments, Error Interception Practices, and Inpatient Medication Errors. *Journal of Nursing Scholarship*, 44(2): 180–



- 186.
- Friese, C.R., Xia, R., Ghafer, A., Birkmeyer, J.D., & Banerjee, M. (2015) Hospitals in “Magnet” program show better patient outcomes on mortality measures compared to non-’Magnet’ hospitals. *Health Affairs*, 34(6): 986–992.
- Gardner, J.K., Thomas-Hawkins, C., Fogg, L., & Latham, C.E. (2007) The relationships between nurses’ perceptions of the hemodialysis unit work environment and nurse turnover, patient satisfaction, and hospitalizations. *Nephrology Nursing Journal: Journal of the American Nephrology Nurses’ Association*, 34(3): 271–281.
- Gikopoulou, D., Tsironi, M., Lazakidou, A., Moisoglou, I., & Prezerakos, P. (2014) The assessment of nurses’ work environment: The case of a Greek General Hospital. *International Journal of Caring Sciences*, 7(1): 269–275.
- Kaitelidou, D., & Kouli, E. (2012) Greece: The health system in a time of crisis. *Eurohealth*, 18(1): 12–14.
- Kohn, L.T., Corrigan, J.M., & Donaldson, M.S. (2000) *To Err Is Human: Building a Safer Health System*. Retrieved from [http://books.nap.edu/html/to\\_err\\_is\\_human/exec\\_summary.html](http://books.nap.edu/html/to_err_is_human/exec_summary.html)
- Lake, E.T. (2002) Development of the practice environment scale of the Nursing Work Index. *Research in Nursing & Health*, 25(3): 176–188.
- Lake, E.T., Shang, J., Klaus, S., & Dunton, N.E. (2010) Patient falls: Association with hospital Magnet status and nursing unit staffing. *Research in Nursing & Health*, 33(5): 413–425.
- Liu, X., You, L.M., Zheng, J., Liu, K., & Liu, J.L. (2019) Creating Healthy Work Environments 2019 Effects of Nursing Leadership on Nurse Burnout and Care Quality: A Structural Equation Modeling Analysis. In *Creating Healthy Work Environments 2019*.
- Makary, M.A., & Daniel, M. (2016) Medical error—the third leading cause of death in the US. *BMJ (Clinical Research Ed.)*: 353, i2139.
- Manojlovich, M., & DeCicco, B. (2007) Healthy work environments, nurse-physician communication, and patients’ outcomes. *American Journal of Critical Care: An Official Publication, American Association of Critical-Care Nurses*, 16(6): 536–543. med/17962497
- McClure, M.L., & Hinshaw, A.S. (2002) *Magnet Hospitals Revisited: Attraction and Retention of Professional Nurses*. American Nurses Publishing. Retrieved from <https://www.amazon.com/Magnet-Hospitals-Revisited-Attraction-Professional/dp/B0087BSRP4>
- Moisoglou, I., Galanis, P., Meimeti, E., Dreliozi, A., Kolovos, P., & Prezerakos, P. (2019) Nursing staff and patients’ length of stay. *International Journal of Health Care Quality Assurance*, 32(6): 1004–1012.
- Mudaly, P., & Nkosi, Z.Z. (2015) Factors influencing nurse absenteeism in a general hospital in Durban, South Africa. *Journal of Nursing Management*, 23(5): 623–631.
- National Quality Forum. (2004) *National voluntary standards for nursing-sensitive care: An initial performance measure set. National Quality Forum*. Retrieved from [https://www.qualityforum.org/Publications/2004/10/National\\_Voluntary\\_Consensus\\_Standards\\_for\\_Nursing-Sensitive\\_Care\\_\\_An\\_Initial\\_Performance\\_Measure\\_Set.aspx](https://www.qualityforum.org/Publications/2004/10/National_Voluntary_Consensus_Standards_for_Nursing-Sensitive_Care__An_Initial_Performance_Measure_Set.aspx)
- Patient safety. (2015) *Joint Commission Online*. Retrieved from [https://www.jointcommission.org/assets/1/23/jconline\\_April\\_29\\_15.pdf](https://www.jointcommission.org/assets/1/23/jconline_April_29_15.pdf)
- Prezerakos, P., Galanis, P., & Moisoglou, I. (2015) The work environment of haemodialysis nurses and its impact on patients’ outcomes. *International Journal of Nursing Practice*, 21(2): 132–140.
- Quality and safety. (2018) *Joint Commission Online*. Retrieved from [https://www.jointcommission.org/assets/1/23/JC\\_Online\\_Sept\\_26.pdf](https://www.jointcommission.org/assets/1/23/JC_Online_Sept_26.pdf)
- Shang, J., Friese, C.R., Wu, E., & Aiken, L.H. (2013) Nursing practice environment and outcomes for oncology nursing. *Cancer Nursing*, 36(3): 206–212.
- Stimpfel, A.W., Sloane, D.M., McHugh, M.D., & Aiken, L.H. (2016) Hospitals Known for Nursing Excellence Associated with Better Hospital Experience for Patients. *Health Services Research*, 51(3): 1120–1134.
- Trinkoff, A.M., Johantgen, M., Storr, C.L., Gurses, A.P., Liang, Y., & Han, K. (2011) Nurses’ work schedule characteristics, nurse staffing, and patient mortality. *Nursing Research*, 60(1): 1–8.
- Vogus, T.J., & Sutcliffe, K.M. (2007) The impact of safety organizing, trusted leadership, and care pathways on reported medication errors in hospital nursing units. *Medical Care*, 45(10): 997–1002.