

# Nursing Practice Environment and Patient Outcomes in University Hospitals in Malaysia

Maziah AM<sup>a\*</sup>, Wichaikhum O<sup>b</sup>, Nantsupawat R<sup>b</sup>

<sup>a</sup>Department of Nursing, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Malaysia

<sup>b</sup>Faculty of Nursing, Chiang Mai University, Thailand

\*Corresponding author: maziah81@gmail.com

Published 1 February 2012

---

**ABSTRACT:** One of the increasing cases of adverse events is a patient safety issue in hospitals worldwide and this requires serious attention by the administrators in the healthcare sector to adopt a positive or healthy nursing practice environment to facilitate minimizing the problem. This descriptive correlation study was designed to assess the category of nursing practice environment and the level of patient outcome; as well as to determine the relationship between NPE and POs as perceived by nurses in university hospitals in Malaysia. Stratified random sampling method was used to recruit samples and 395 nurses (94.3%) participated by responding on a self-rated 45-item questionnaire. Data were collected using the Practice Environment Scale of the Nursing Work Index and the Adverse Events Instrument to assess nursing practice environment and perceived negative outcomes respectively. The reliability coefficients of the research instruments were 0.89 and 0.81. The study showed that the nursing practice environment in university hospitals were unfavorable ( $\bar{X} = 2.44$ ), which describes nurses' perception as highly disagreeable and dissatisfaction with the characteristics of nursing practice environment in their daily duty and suggested as an unfavorable environment. This study indicated that the perceived level of patient outcome was low with patient falls ( $\bar{X} = 1.55$ ) and medication errors ( $\bar{X} = 1.59$ ), whereas nosocomial infections ( $\bar{X} = 2.04$ ) and patient complaints ( $\bar{X} = 2.15$ ) were moderate suggesting that patient outcome in UHs need to be improved to gain better patient outcomes mainly on nosocomial infections and patient complaints. It was also found that the nurse manager ability, leadership and support of nurses were associated with patient falls ( $r = -0.123$ ,  $p = 0.015$ ), nurse-physician relations were associated with patient complaints ( $r = -0.105$ ,  $p = 0.038$ ) and overall nursing practice environment was associated with patient complaints ( $r = -0.116$ ,  $p = 0.021$ ). Our result show that better nursing practice environment leads to decrease in adverse events particularly patient falls and patient complaints which translated to better patient outcomes. When nursing practice environment was found to be an unfavorable environment, a significant relationship between nursing practice environment and patient outcomes allowed intervention to enable better improvement of the environment to produce positive patient outcomes in hospital settings.

**Keywords:** Nursing practice environment, patient outcomes, nurses

## Introduction

Despite most healthcare provider's holding to the principles of 'do no harm', patient's

safety issue that called as adverse events from medical care appears to pose a substantial burden to the world's population (Department of Health, 2004; WHO, 2008).

Statistics show that 10% of patients reported experience of medication errors and nosocomial infections in hospital care (Rothschild *et al.*, 2005). Adverse events occurred in one out of ten hospitalized patients around the world and patients harmed proportion was higher in developing countries (WHO, 2009). In hospitals across Malaysia, 2,572 cases of medication errors were reported and it was identified as a main adverse event issue that impacted on patient outcomes in 2009 (Anonymous, *in press*). Patient outcomes (POs) are the results of care structures which are environmental and include processes that integrate functional, social, physical, psychological and physiologic aspects of people's experience in positive outcomes and adverse events (Mitchell *et al.*, 1998). The adverse events refer to results that show the occurrence and frequency of negative patient incidents which uses nursing-sensitive indicators to assess outcomes sensitive to nursing care (Laschinger and Leiter, 2006). Most previous studies were focused on adverse events rather than positive patient outcomes because adverse events data are normally documented in medical records in various hospitals worldwide (Needleman *et al.*, 2001).

In today's complex healthcare environment, understanding the scope of, and solutions that include factors contributing to adverse events for the rest of the world is a crucial component and is a strategy to improve patient outcomes as well as to ensure the delivery of safe and effective care (Thornlow, 2005; Smith and Giuliano, 2010). Factors impacting POs during hospitalization include coordination of care (Yen and Lo, 2004), heavy workload (Pekkarinen *et al.*, 2008), staffing (Needleman *et al.*, 2002; Thungjaroenkul *et al.*, 2008) and leadership practice (Houser, 2003; Wong and Cummings, 2007) result in patients receiving either positive outcomes

or adverse events according to the structure and processes of care by nurses (Stone *et al.*, 2007). As reported in literature, one of the major factors influencing nurses in doing interventions and providing care to patients that leads to a decrease or increase of POs in the wards is nursing practice environment (Huycke and All, 2000; Lucero *et al.*, 2009).

Nursing practice environment (NPE) refers to the organizational characteristics of a work setting that facilitates or constrains professional nursing practice from delivering care to patients (Lake, 2002). Nurses who rated and felt that their wards had a positive or healthy practice environment were more committed to the organization, more satisfied, could create a culture of safety and were able to provide the highest quality of care (Laschinger *et al.*, 2000). In Malaysia, a study indicated nearly half of nurses in a public hospital in Kuala Lumpur a stressful experience related to NPE factors (Rokiah, 1994). On the other hand, Laschinger and Leiter's study (2006) indicated that the quality of NPE could decrease patient falls, nosocomial infections, medication errors and patient complaints. Manojlovich and DecCicco's study (2007) showed that medication errors were significantly related to the practice environment scale. Whenever nurses' perception of positive NPE increased, medication errors decreased. A study by Friese *et al.* (2008) shows that hospitals in category of unfavorable NPEs had higher mortality rates in thirty-day of admission, higher complication rates and higher failure-to-rescue compared to favorable or good NPEs. These results demonstrated the importance of the favorable NPE in reducing adverse events across in-patient units or wards in hospitals Friese *et al.* (2008).

University hospitals (UHs) are sometimes present with the issue that many adverse events could have been under reported.

Nurses may be reluctant to admit mistakes made due to repercussions thereafter which may affect on their nursing career. According to Manojlovich and DeCicco (2007), nurse self-report is an alternative method to gather real data because when this method is used in a study, nurses would accurately report information about patients under their care and thus, they can get a higher number of adverse events compared to the number from medical records. In a study by Sochalski (2001) it was shown that through self-report, higher rates of adverse events such as medication errors and nosocomial infections in multiple units in the hospital were recorded indicating that nurses are more willing to report adverse events anonymously. This situation may apply to UHs, although the UHs also have an IR system. Self-report is an appropriate method to obtain the perception of nurses and in this study assess the category of NPE, the level of POs and to examine the relationship between NPE and POs as perceived by nurses in university hospitals (UHs) in Malaysia.

## **Materials and Methods**

The study was conducted in three university hospitals in Malaysia from January to February 2011, using descriptive correlation research design. Approval to conduct the study was obtained from the Institute Review Board, Chiang Mai University and the Medical Research and Ethics Committee UHs (Project Code No.FF-017-2011). Stratified random sampling method was used to recruit samples and confidentiality was maintained throughout the study. A total of 395 nurses (94.3%) participated in the study from the 8 eight departments namely critical nursing, pediatric nursing, psychiatric nursing, emergency/ orthopedic nursing, operating room/ oncology, surgical/ ophthalmology/ ENT, obstetrics and gynecology, and medical nursing department

in three UHs. A self-rated 45 item questionnaire was used. Demographic data such as age, education level, working experience, involvement as committee member and working extra time were collected. The Practice Environment Scale of the Nursing Work Index (PES-NWI) (Lake, 2002) assessed nursing practice environment whereas the Adverse Events Instrument (Laschinger and Leiter, 2006) assessed adverse events as perceived by subjects for this study. The PES-NWI has 31 items on a four-point Likert scale and consists of five domains: a) nurse participation in hospital affairs, b) nursing foundation for quality of care, c) nurse manager ability, leadership and support of nurses, d) staffing and resources adequacy, and e) collegial nurse-physician relations. Adverse Events Instrument consists of four items: a) patient falls, b) medication errors, c) nosocomial infections, and d) patient complaints. For NPE, the interpretation for each domain shows that mean score if  $> 2.50$  means favourable and the mean score  $\leq 2.50$  means unfavourable. The interpretation of the Adverse Events Instrument shows that mean score of 1.00 - 2.00 indicates low level of PO, mean score of 2.01 – 3.00 indicates moderate level of PO and mean score of 3.01 - 4.00 indicates high level of PO. The PES-NWI was translated by the researcher using back translation technique. Validity and reliability of instruments have been tested. The Cronbach Coefficient alpha of the instruments was 0.89 and 0.81 respectively. Data were analyzed using descriptive statistics and Spearman's rank-order Correlation through the Statistical Package for Social Science version 16.

## **Results**

A total of 395 subjects (94.3%) participated in this study. The majority of subjects were within age group of 21-30 years (n=236 or 59.7%), diploma nurses (n= 363 or 91.9%)

and had experience in nursing career more than 5 years (n=234 or 59.1%). Most of the nurses who took part in this study were working extra time such as doing overtime (n=186 or 47.1%), working in other wards (n=100 or 25.3%), doing double shifts (n=174 or 44.1%) and working during days off (n=222 or 56.2%). There were less nurses involved in hospital affairs such as being a member in quality assurance (n=9 or 2.3%), infection control (n=36 or 9.1%), CNE (n=52 or 13.2%) or ISO (n=17 or 4.3%)(TABLE 1). NPE categorization as perceived by nurses in eight departments from the three university hospitals is shown in TABLE 2. Overall NPE was rated as being unfavourable ( $\bar{X} = 2.44$ ) which shows nursing foundations for quality of care was only above the mean score of 2.50 as compared to the other four domains.

Patient outcomes level as reported from the nurses' perception about patients under their care over the past one year is shown in TABLE 3. It is shown that the level of patient falls ( $\bar{X} = 1.55$ ) and medication

errors ( $\bar{X} = 1.59$ ) were low, while the level of nosocomial infections ( $\bar{X} = 2.04$ ) and patient complaints ( $\bar{X} = 2.15$ ) were moderate.

The relationship between NPE and POs is shown in TABLE 4. Overall NPE has a significant weak negative correlation with patient complaints (r=-0.116, p=0.021). For NPE domains, collegial nurse-physician relations were statistically significant weak negative correlations with patient complaints (r=-0.105, p=0.038). There was a statistically significant weak negative correlation between nurse manager ability, leadership and support of nurses with patient falls (r=-0.123, p=0.015).

Pur result show that, a favourable nursing practice environment will contribute to a decrease in the occurrence of adverse events and this translates to positive POs particularly patient complaints and patient falls.

**TABLE 1-** Demographic data: frequency and percentage of the characteristics of the sample

Characteristics	Frequency (n)	Percentage (%)
<b>Age</b>		
21 - 30 years	236	59.7
31 - 40 years	115	29.1
41 - 50 years	38	9.8
> 50 years	6	1.4
<b>Education</b>		
Diploma	363	91.9
Bachelor	32	8.1
<b>Experience</b>		
1.0-2.0 years	79	20.1
2.1-3.0 years	42	10.7
3.1-5.0 years	40	10.1
> 5.0 years	234	59.1
<b>Committee member</b>	9	2.3
Quality Assurance (QA)	36	9.1
Infection Control	52	13.2
Continuing Nursing Education (CNE)	17	4.3
International Standardization Organization (ISO)		

<b>Working extra time</b>	186	47.1
Doing overtime	100	25.3
Working at other ward	174	44.1
Doing double shifts	222	56.2
Working during day off		

**TABLE 2** -Mean score, standard deviation, and categorization of nursing practice environment as perceived by nurses (n = 395)

<b>Nursing practice environment</b>	<b>Mean</b>	<b>SD</b>	<b>Categorization</b>
Nurse participation in hospital affairs	2.36	0.48	Unfavorable
Nursing foundations for quality of care	2.91	0.50	Favorable
Nurse manager ability, leadership and support of nurses	2.29	0.49	Unfavorable
Staffing and resources adequacy	2.14	0.49	Unfavorable
Collegial nurse-physician relations	2.50	0.57	Unfavorable
Overall of nursing practice environment	2.44	0.36	Unfavorable

**TABLE 3** - Mean score, standard deviation (SD), and level of patient outcome

<b>Patient Outcomes</b>	<b>Mean</b>	<b>SD</b>	<b>Level</b>
Patient falls	1.55	0.83	Low
Medication errors	1.59	0.85	Low
Nosocomial infections	2.04	1.00	Moderate
Patient complaints	2.15	1.03	Moderate
Overall of patient outcomes	1.83	0.74	Low

**TABLE 4** - Relationship between nursing practice environment and patient outcomes (n = 395)

<b>Nursing practice environment</b>	<b>Patient outcomes</b>			
	<b>Patient falls</b>	<b>Medication errors</b>	<b>Nosocomial infections</b>	<b>Patient complaints</b>
	<b>r</b>	<b>r</b>	<b>r</b>	<b>r</b>
Overall of NPE	-0.062	-0.089	-0.051	<b>-.116*</b>
Nurse participation in hospital affairs	-0.058	-0.092	-0.079	-0.065
Nursing foundations for quality of care	-0.070	-0.089	-0.026	-0.084
Nurse manager ability, leadership and support of nurses	<b>-.123*</b>	-0.090	-0.004	-0.072
Staffing and resources adequacy	-0.001	-0.052	-0.023	-0.072
Collegial nurse-physician relations	-0.019	-0.095	-0.055	<b>-.105*</b>

p < 0.05

## Discussion

### *Category of nursing practice environment*

The main objectives of this study was to assess the category of nursing practice environment, to assess the level of patient outcomes and to examine the relationship between nursing practice environment and patient outcomes as nurses' perception in university hospitals, Malaysia, which to our knowledge has not been studied earlier. Responses from nurses regarding five domains in NPE concepts showed that mean score of nurse participation in hospital affairs was 2.36, mean score of nursing foundations for quality of care was 2.91, mean score of nurse manager ability, leadership and support of nurses was 2.29, mean score of staffing and resources adequacy was 2.14 and mean score of collegial nurse-physician relations was 2.50. This indicated that nursing foundation for quality of care was above the mean score of 2.50 compared to other domains and it was also suggested as favorable, whereas other domains were considered unfavorable. The mean score of each domain of NPE reflects agreement and nurses' satisfaction of the specific characteristic of NPE, whether it exists or not in the nurses' current job which may impact on work functioning in their daily practice. Results of this study showed that, overall NPE in UHs were found to be unfavorable ( $\bar{X} = 2.44$ ) which describes high disagreement and dissatisfaction among nurses to the characteristics of NPE.

Our results show that, nurses rated the most number of disagreements and dissatisfaction of NPE domains and this suggests that the nurses' practice environment is unfavourable. This is supported by a study by Rokiah (1994), who demonstrated that more than 49.5% nurses in a public hospital in Kuala Lumpur agreed that NPE factors

resulted in a stressful experience in their practice environment.

Our statistics show that NPE was unfavourable suggesting that the environment in UHs could not empower nurses in doing their responsibilities. NPE factors were presented with the issues of less of nurses' involvement in internal administrative, inability of nurse managers, ineffectiveness in nursing management practice, inadequate support from nurse managers, insufficient staffing, resources and time to provide quality of care, heavy workload as well as less nurse-physicians relations (Lake, 2002). Thus, this may influence subjects in rating their environment based on their present situation in their workplace. Our finding is consistent with the findings of Friese *et al.* (2008) and Chiang and Lin's study (2008) who demonstrated the presence of unfavourable NPE in nurses' daily practice although the health care system is different from Malaysia. Therefore NPE in UHs requires improvement for better satisfaction among nurses.

It is worth nothing that our findings related to the category of NPE were contradicting and inconsistent with the findings of Roche and Duffield (2010) and Aiken *et al.* (2008). Roche and Duffield's study (2010) indicated that the category of NPE at a general acute and mental-health ward in Australia was favourable. In contrast, Aiken *et al.*'s (2008) study revealed that the practice environment at medical-surgery, intensive care unit, and operating room fell into the mixed category. The difference in these findings might be due to the difference in cultural patterns, where previous studies being conducted in more advanced countries, with better technology and nursing services as compared to Malaysia. Different socio economic characteristics may also contribute to the results because advanced medical

services are readily available and affordable in more advanced countries (Danny, 2003; Department of Statistic and Economic Planning Unit, 2010).

#### *Level of patient outcomes*

This study indicates that there was low level of patient falls ( $\bar{X} = 1.55$ ) and low level of medication errors ( $\bar{X} = 1.59$ ). The result is consistent with the study by Aiken *et al.*, (2001), Sochalski (2001), Laschinger and Leiter (2006) and Lucero, Lake and Aiken (2010) also reporting that patient falls and medication errors have lower average scoring than patient complaints and nosocomial infections. This was difficult to explain the pattern of the results but one possible reason is under-reporting of the incidents. Nurses may feel reluctant to admit their mistakes due to the repercussions thereafter. The similar result was shown from previous studies and this may be due to the application of similar preventive measures for patient falls and medication errors as those practices in developed countries.

Between nosocomial infections and patient complaints, the results show moderate level of nosocomial infections ( $\bar{X} = 2.04$ ) and moderate level of patient falls ( $\bar{X} = 2.15$ ). This finding is consistent with the study of Yen and Lo (2004) and Pekkarinen *et al.*, (2008). Yen and Lo's study (2004) showed that poor coordination of care due to inadequate number of staffing and high workload, as well as lack of involvement from multiple providers in nurses' care activities may contribute to an increase in nosocomial infections and patient complaints between moderate to high level of PO. Pekkarinen *et al.* (2008) study indicated that time pressure as referred to excessive workload, hard work and inadequate time to work was contributed to nurses attempting to

maintain passive care routines and care practice. This also leads to an increase in nosocomial infections and patient complaints between moderate to high level of POs. The similarity between this study and the previous study might be because of individual factors such as less participation in any educational and training program to enhance and update existing knowledge.

Interestingly, 96 (24.3%) subjects in the present study perceived that patient falls case had occurred once a year or once in every six months, 33 subjects (8.4%) perceived that the case had occurred once a month or once in three months, and 18 (4.6%) of subjects perceived that the case had occurred once daily or once in every 3 days or once a week. However, it seems difference when the statistics compared to the real data from IR system which indicates patient falls case in a year were 52 cases in 2008 and 42 cases in 2009 (Nursing Management Department, 2010). This shows that more cases of patient falls had occurred in a year than documented data and as the evident that most adverse events are under reported. Using nurse self-report, more nurses are willing to anonymously report adverse events compared to real data. This finding is supported by the finding of Aiken *et al.* (2001), Sochalski (2001), and Laschinger and Leiter (2006) which indicated that nurse self-report is an appropriate method to use for collecting the adverse events data due to nurses may accurately report information about patient under their care.

#### *Relationship between nursing practice environment and patient outcomes*

This study examined the relationship between NPE and POs as perceived by nurses. It found a significant weak negative correlation between overall NPE and patient complaints. This means that a healthy NPE with no unfavorable environment in nurses'

practice enhance patient outcomes especially on patient complaints. It is supported by Laschinger and Leiter's finding (2006), which revealed that all domains in nursing practice environments had a relationship with patient outcomes. Similar findings were also found from a study by Manojlovich and Dec Cicco (2007), Friese *et al.* (2008) and Aiken *et al.* (2008) which showed that overall NPE had a negative weak significant relationship with the POs in the wards setting.

In relation to each domain of NPE, this study found a significant weak negative correlation between collegial nurse-physician relations and patient complaints. In other words, the more favorable the collegial nurse-physician relationship, the lower cases of patient complaints was reported. This finding is consistent with the previous finding from Yen and Lo's study (2004) which showed that favorable collegial nurse-physician relationship was associated with lower length of stay when patients were hospitalized. Our results are also consistent with the findings of Lucero, Lake and Aiken (2010) however their study was focused on the relationship between nurses' report of unmet nursing care needs and nurses' reports of wrong medication or dose, nosocomial infections and patient falls with injury. It shows whenever met nursing care needs increase, the occurrence of adverse events in hospitals decreases, thus leads to more positive patient outcomes.

Our finding is consistent with nurse manager ability, leadership and support of nurses. There was a weak negative correlation between nurse manager ability, leadership and support of nurses and patient falls. The more favourable the nurse managers ability, leadership and support of nurses in the nurses' practice environment, the less cases of patient falls were reported. This finding is similar to those reported by Houser (2003)

and Wong and Cummings (2007). Houser's study (2003) demonstrated that the nurse manager who has ability, leadership skills and give support to her staff had negative significant relationship with adverse events: pneumonia and urinary tract infection, medical errors and patient falls. Wong and Cummings's study (2007) showed that nurse manager ability, leadership and support of nurses had negative significant relationship with adverse events: patient falls; medication errors and infection rates.

This study can assist in our understanding to move forward on promoting and developing positive practice environment for nurses to help decrease the occurrence of adverse events in daily practice, to produce productive, safe and knowledgeable nurses who can provide good practice, good services and increase practicing of safe patient care in clinical practice, and to be more active in continuing nursing education programme particularly in patient outcomes, leadership style, communication skills, teamwork and collaboration as well as patient safety can be established.

### **Conclusion**

We conclude that NPE in university hospitals are unfavorable where nurses' practice environment were presented with the issue of less involvement among nurses in hospital affairs, inability and ineffectiveness of nurse managers, insufficient support and motivation from nurse managers, inadequate staffing, resources and time to accomplish care as well as less nurse-physician relations. In terms of perceived POs, there was a low level of patient falls and medications errors, as well as a moderate level of nosocomial infections and patient complaints. A significant association between overall NPE and patient complaints, collegial nurse-physician relations with patient complaints

and nurse manager ability, leadership and support of nurses with patient falls was observed. NPE needs to be given a more serious consideration and proper intervention. Positive or healthy NPE should

be introduced in the nurses' practice environment to improve the environment and produce positive outcomes in hospital settings.

## References

1. Aiken, L.H., Clarke, S.P., Sloane, D.M., Lake, E.T. and Cheney, T. (2008). Effects of hospital care environment on patient mortality and nurse outcomes. *J Nurs Adm* 38 (5): 223-229.
2. Aiken, L.H., Clarke, S.P., Sloane, D.M., Sochalski, J.A., Busse, R., Clarke, H., Giovannetti, P., Hunt, J., Rafferty, A.M. and Shamian, J. (2001). Nurses' reports on hospital care in five countries. *Health Affairs* 20 (3): 43 – 53.
3. Anonymous. Warning on patient safety. *New Straits Times*, in press.
4. Chiang, H-Y. and Lin, S-Y. (2008). Psychometric testing of the Chinese version of nursing practice environment scale. *Journal of Clinical Nursing* 18: 919 – 929.
5. Danny, M.N. (2003). Developed and developing country. <http://www.scalloway.org.uk/popu6.htm>. (Retrieved on 16 March, 2011).
6. Department of Health. (2004). Standards for better health. [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_4086665](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4086665). (Retrieved on 16 June, 2010).
7. Department of statistic and economic planning unit. (2010). Malaysian population chat and statistic. [http://www.malaxi.com/population\\_size\\_age\\_structure2001\\_2010.html](http://www.malaxi.com/population_size_age_structure2001_2010.html). (Retrieved on 16 July, 2010).
8. Friese, C.R., Lake, E.T., Aiken, L.H., Jeffrey, H., Silber, J. H. and Sochalski, J. (2008). Hospital nurse practice environments on outcomes of surgical oncology patients. *H. Serv Res.* 43 (4): 1145 – 1163.
9. Houser, J. (2003). A model for evaluating the context of nursing care delivery. *Journal of Nursing Administration* 33 (1): 39 – 47.
10. Huycke, L. and All, A.C. (2000). Quality in health care and ethical principles. *Journal of Advanced Nursing* 32 (3): 562 – 571.
11. Kanai-Pak, M., Aiken, L.H., Sloane, D.M. and Poghosyan, L. (2008). Poor work environments and nurse inexperience are associated with burnout, job dissatisfaction and quality deficits in Japanese hospital. *Journal of Clinical Nursing* 17: 3324 – 3329.
12. Lake, E.T. (2002). Development of the practice environment scale of the nursing work index. *Res Nurs Health* 25 (3): 176 – 188.
13. Laschinger, H.K.S., Finegan, J., Shamian, J. and Casier, S. (2000). Organizational trust and empowerment in restructured healthcare settings: Effects on staff nurse commitment. *Journal of Nurs Adm.* 30 (9): 413 – 425.

14. Laschinger, H.K.S. and Leiter, M.P. (2006). The impact of nursing work environments on patient safety outcomes: The mediating role of burnout/ engagement. *Journal of Nursing Administration* 36 (5): 259 – 267.
15. Lucero, R.J., Lake, E.T. and Aiken, L.H. (2009). Variations in nursing care quality across hospitals. *Journal of Advanced Nursing* 65 (11): 2299 – 2310.
16. Lucero, R.J., Lake, E.T. and Aiken, L.H. (2010). Nursing care quality and adverse events in US hospitals. *Journal of Clinical Nursing* 19: 2185 – 2195.
17. Mitchell, P.H., Ferketich, S. and Jennings, B.M. (American Academy of Nursing Expert Panel on Quality Health Care 1998). Quality health outcomes model. *J. of Nursing Scholarship* 30 (1): 43 – 46.
18. Manojlovich, M. and DeCicco, B. (2007). Healthy work environments, nurse-physician communication, and patients' outcomes. *AJOCC* 16 (6): 536 – 543.
19. Needleman, J., Buerhaus, P., Mattke, S., Stewart, M. and Zelevinsky, K. (2001). *Nurse-staffing levels and patient outcomes in hospitals*. Boston: Harvard School of Public Health.
20. Needleman, J., Buerhaus, P., Mattke, S., Stewart, M. and Zelevinsky, K. (2002). Nurse-staffing levels and the quality of care in hospitals. *New England Journal of Medicine* 346: 1715 – 1722.
21. Pekkarinen, L., Sinervo, T., Elovainio, M., Noro, A. and Finne-Soveri, H. (2008). Drug use and pressure ulcers in long-term care units: Do nurse time pressure and unfair management increase the prevalence? *Journal of Clinical Nursing* 17: 3067–3073.
22. Rokiah, M. (1994). Prevalens tekanan and penyebab tekanan kerja di kalangan jururawat terlatih Hospital Kuala Lumpur. Dissertation. Universiti Kebangsaan Malaysia.
23. Roche, M.A. and Duffield, C.M. (2010). A comparison of the nursing practice environment in mental health and medical-surgical settings. *Journal of Nursing Scholarship* 42 (2): 195 – 206.
24. Rothschild, J.M., Landrigan, C.P., Cronin, J.W., Kaushal, R., Lockley, S. W., Burdick, E., Stone, P.H., Lilly, C. M., Katz, J.T., Czeisler, C.A. and Bates, D. W. (2005). The critical care safety study: The incidence and nature of adverse events and serious medical errors in intensive care. *Critical Care Medicine Journal* 33 (8): 1694 – 1700.
25. Smith, L. W. and Giuliano, K. K. (2010). Rapid response teams: Improve patient safety and patient outcomes. *Journal of Advanced Critical Care* 21(2):126 – 129.
26. Sochalski, J. (2001). Quality of care, nurse staffing, and patient outcomes. *Policy, Politics, and Nursing Practice* 2 (1): 9 – 18.
27. Stone, P. W., Mooney-Kane, C., Larson, E. L., Horan, T., Glance, L. G. and Zwanziger, J. (2007). Nurse working hospital in Thailand. *Nursing and Health Sciences* 10: 31 – 36.
28. Thornlow, D. (2005). Relationship of patient safety to patient outcomes: Analysis of HCUPnet patient safety indicators. *Journal of Academy Health* 22: 3953.

29. Thungjaroenkul, P., Kunaviktikul, W., Jacobs, P., Cummings, G.G. and Akkadechanunt, T. (2008). Nurse staffing and cost of care in adult intensive care units in a university conditions and patient safety outcomes. *Medical Care* 45 (6): 571 – 578.
30. Unruh, L. (2003). Licensed nurse staffing and adverse events in hospitals. *Medical Care* 41 (1): 142 – 152. Wong, C. A. and Cummings, G. G. (2007). The relationship between nursing leadership and patient outcomes: A systematic review. *Journal of Nursing Management* 15: 508 – 521.
31. World Health Organization (WHO). (2008). *Summary of the evidence on patient safety: Implications for research*. Geneva, Switzerland: WHO.
32. World Health Organization (WHO). (2009). *The world health report 2009-health system: Improving performance*. Geneva: World Health Organization.
33. Yen, M. and Lo, L-H. (2004). A model for testing the relationship of nursing care and patient outcomes. *Nursing Economic* 22 (2): 75 – 80.