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Limitations of Hospital Ward Quality Monitoring Reporting in Australia: A Discussion Paper

Xiaoquan Xu [1], Sai Lu[1], Trish Burton[1], Liza Heslop[2]

[1]School for Nursing and Midwifery, Victoria University, Melbourne, Australia
[2]School for Nursing and Midwifery, Centre for Applied Informatics,Victoria University, Melbourne, Australia

Abstract

The limitations of hospital ward quality monitoring and reporting and factors contributing to the limitations are identified and discussed in this paper. In general, the limitations comprise a lack of standardisation in hospital ward quality monitoring reports, absence of nursing informatics in the hospital information system, inadequate development of nurse sensitive indicators and a lack of input from frontline nurses. Moreover, the nursing practice environment (NPE) is poorly conceptualized and there are competing and conflicting viewpoints about the parameters of the NPE. These limitations have contributed to the current state of ward quality monitoring and reporting. As a result, frontline nurses in the acute ward setting cannot receive meaningful and sensitive information to support their endeavours to monitor and enhance nursing care quality. In order to address challenges of the NPE and meet specific requirements of frontline nurses to support their quality improvement activities and decision-making processes, further research should be developed to explore, describe and examine quality monitoring processes.

Keywords: Nursing Services Improvement; Performance Management; Nurse Sensitive Indicators

1 Introduction

There is a global nursing workforce crisis. According to the Australian Health Workforce Advisory Committee, Australia will be short of 40,000 nurses by 2016 [1]. The shortage of nurses is associated with an unfavourable nursing practice environment (NPE) which is known to have a direct link to reduced nursing care quality [2-7]. Therefore, it is important to monitor and maintain standards of nursing care quality within the NPE. The NPE denotes the domain of the hospital ward setting where nurses have a degree of autonomy and control over processes of nursing care delivery. Unfortunately, nurses at the frontline may not receive meaningful information that is sensitive to the input of nursing care processes [8]. Therefore, a professional debate is needed to progress hospital ward quality monitoring [9-12]. The aim of this discussion paper is to explain the limitations of hospital ward quality monitoring and reporting and their contributing factors in Australia, and to consider the future research needed to support quality monitoring and improvement processes.

2 Limitations of Current Quality Monitoring and Reporting

Performance measurement can generate meaningful information to enable and motivate health professionals to change practice and improve patient outcomes [6, 10, 13-17]. However, the entire field of nurse-related quality monitoring and reporting remains an underdeveloped and complex phenomenon. The process of current hospital ward quality monitoring and reporting has a number of limitations.

First, a review of current literature suggests that processes of current hospital ward quality monitor-

ing and reporting varies greatly [10, 11, 13, 14]. The variation occurs predominantly due to a lack of consensus and clarity on what are the key parameters that should form the base of quality monitoring and reporting [15, 18-21]. Although there have been numerous reports on the issue overseas, only limited information is available in Australia [8, 18, 22].

Secondly, despite data routinely housed in hospital information system, which could more or less provide meaningful metrics for monitoring quality of nursing care, nurse related outcomes are rarely stored in a standardized format in hospital information systems [23]. Thirdly, given that frontline nurses are in prime position to contribute to quality monitoring and reporting activities within hospital ward settings, it is self-evident that unless these nurses have a comprehensive understanding of what quality measures are significant, the activities within the NPE can neither be operationalised nor implemented effectively. Currently, there is little evidence in Australia to suggest that nurses at the frontline are presented opportunities to voice their concerns about the issues and/or engage in the development of the quality monitoring and reporting system in a meaningful way [2, 12, 18, 24].

Finally, despite that research evidence supports the concept of nursing sensitive indicators (NSIs) as a potential measure to monitor nursing care quality [12, 25-28], there is a dearth of information about how the existing data systems within Australian hospital information systems can be best utilized to generate meaningful reports to monitor the quality of care [12]. To the best of the authors' knowledge, no study has been undertaken in Australia to source and ascertain the most meaningful indicators to measure nursing care quality.

3 Factors Contributing to Limitations of Current Quality Monitoring and Reporting

For effective quality monitoring and reporting to occur in healthcare, there must be acknowledged and defined constructs and associated parameters that can be measured confidently. Further, measurements should have proven levels of validity and reliability. These principles also apply to effective quality monitoring of the NPE. Several factors have been identified as contributors to slow growth of measurement within the NPE. They include competing and conflicting conceptualizations of the NPE, the lack of instrument development to form an acceptable standardized measure for the NPE, a lack of development needed to realize performance measures of nursing care quality that derive from existing hospital information data, and other key challenges that impact upon nurses engagement with quality monitoring and reporting.

3.1 Conceptualizations of the NPE

Over a decade ago, Allred et al., [29] discussed the nursing practice environment in detail and made the following statement "… we currently lack a meaningful way to describe nursing practice environments. There is little agreement about what factors compose a nursing unit's relevant environment, the state of the environment, and the relationship between the unit's environment and the experience of uncertainty" (p. 319-320). During the 1990's an extensive range of concepts were used to describe dimensions of the NPE [30-32]. Ongoing research on the nursing infrastructure of the NPE has been conducted since that time. Research in this area has proven associations between nursing practice enhancements and outcomes such as adverse events within the NPE [12, 15, 17, 18, 33]. Still, there are various viewpoints about the parameters of measurement within the NPE [15, 18, 20, 21, 34]. In Australia, there are very few studies, which have conceptualized the NPE, and even fewer studies which have the NPE substantiated by metrics [2, 12, 18, 22]. As a consequence, theoretical understandings of the NPE remain underdeveloped.

Aiken [21] and Lake [20] have made a significant contribution to theorize core dimensions of the NPE with a focus on organizational factors. Their research produced two separate conceptual foci of the NPE. Aiken (2000, p.146) proposed the NPE to be " … a system that supports registered nurse control over the delivery of nursing care and the environment in which care is delivered." Hence the first core dimensions of the NPE relat to the nurses' role in care delivery. In 2002, Lake (2002, p.178) proposed the NPE as "… the organizational characteristics of a work setting that facilitate or constrain professional nursing practice". It appears this second focus relates to both helpful and constraining characteristics of the environment on nursing practice

3.2 Instruments

Currently, there are a number of instruments available to measure the nursing environment at the ward level. A summary is provided in Figure 1 (see Appendix). The Nursing Work Index (NWI) is an early instrument developed by Kramer and Hafner

(1989) [33]. The NWI is based on the organizational characteristics of 46 magnet hospitals which participated in the survey. The index comprises 65 items. For each item, nurses respond on a 4-point Likert scale to three statements. The NWI has limitations. For example, its substantive domains are not identified empirically, nor are reference values available; it is time consuming for respondents to complete the extensive number of items, and there is no subscale highlighting nurse autonomy [20, 21]. In light of these limitations, a Revised- Nursing Work Index (NWI-R) was proposed by Aiken and Patrician (2000) [21]. The NWI-R comprises 4 subscales which are 'autonomy', 'control over the work environment', 'relationship with physicians', and 'organizational support'.

In comparison with NWI, the NWI-R focuses on the presence of special organizational traits which reflect features of nursing job satisfaction and hospital outcomes at the unit and hospital levels. It has been used widely in many countries and in different hospitals types [4, 5, 35, 36]. Validity of the NWI-R has been established via content, criterion and constructs aspects. The NWI-R has been reported as an important instrument for measuring supervising aspects of a positive organizational workplace [23, 37, 38]. However, recently some researchers [20, 39-41] have had distinct opinions about its stability, dissemination and utility. It has been suggested that: 1. NWI-R includes many items which are time consuming for respondents [20]; 2. The factor structure of NWI-R cannot be replicated statistically [41]; 3. This lack of a model fit with data has raised questions about the validity of NWI-R as measure of the NPE [40], and 4. It measurement is limited to three theory-based domains of the practice environment and it has insufficient common domains content [39].

In response to various concerns regarding utilization of the instrument, the data of Kramer's study [33] in magnet hospitals, which was used to develop the NWI further through empirically derived items and factor analysis. Therefore, a parsimonious, psychometrically sound Practice Environment Scale of NWI (PES-NWI) emerged [20]. PES-NWI comprises 5 subscales: nurse participation in hospital affairs; nursing foundations for quality of care; nurse manager ability, leadership, and support of nurse; staffing and resource adequacy; collegial nurse-physician relations. The final subscale of PES-NWI remains identical to the NWI-R subscale Nurse-Physician Relationships [42]. PES-NWI comprises four theory-based domains and contains a staffing/workload domain as well. At the same time, 31 items has reduced the survey length and allows for higher respondents' rates. For these reasons, PES-NWI was chosen as one of The National Database of Nursing Quality Indicators (NDNQI) for measuring the NPE by the American Nurses Association (ANA). In spite of having many advantages, the PES-NEI still has limitations: it does not cover all salient domains of the environment [39]. Its five-factor model requires improvement on theoretical and measurement dimensions [40]. It has been suggested that a short form of PES could be developed [39]. A target level of the organization (hospital or nursing unit) had not been explicitly studied [20] and the application of the instrument is not as wide as the NWI-R [39].

3.3 Performance Measures of the NPE

There are widespread concerns about health care quality and costs arising from adverse events. Stakeholders, such as patients and health care professionals require health information about how the health care system is performing. Measurement of the NPE should contribute to quality monitoring and reporting and the bigger picture of health care quality for all stakeholders. Still, measurement of the NPE remains a challenge. Whilst some measures have been adopted in countries such as Belgium and the Japan [4, 5, 35, 37], the measures often differ and lack standardization. The research in Australia on measurement of nursing care quality related NPE has, to date, largely focused on the study of the relationship of variables within the NPE, such as nursing job satisfaction and the patient outcomes [2, 12, 18, 22]. At an international level, there are various forms of systematic and comprehensive reporting of nursing care quality at the ward/unit level [6, 9, 13, 14, 16, 17]. Nevertheless, there is very little description about nursing care quality monitoring at the hospital unit/ward level in Australia [12].

Several studies have identified different nurse sensitive indicators that reflect aspects of nursing care performance within various practice environments [12, 25, 27, 28]. Nursing sensitive indicators (NSI) – clinical indicators which are sensitive to the input of nursing care for monitoring quality of nursing - provide potential to transform the work environment for nurses and keep patients safe. The emerging concept of NSI is important for the NPE as the indicators present as possible measures of hospital unit/ward monitoring performance and quality [12, 43]. A summary of proposed nurse sensitive indictors is provided in Figure 2.

The most systematic, comprehensive and standard-

ized definition of nurse sensitive indicators is the National Database of Nursing Quality Indicators (NDNQI) developed by American Nursing Association (ANA) where nursing-sensitive indicators reflect three NPE constructs - the structure (nursing staffing and skill level), process (assessment, intervention, and RN job satisfaction) and outcomes of nursing care (patient outcomes). The three constructs comprise thirteen components [44]. After that, ANA issued a request for proposals to state nursing associations for research, development and planning projects. The California Nursing Outcomes Coalition (CalNOC) was one of the first projects which is voluntary collaborative professional initiative with a mission to: (a) build and sustain the CalNOC statewide nursing staffing and quality database repository; (b) conduct research to advance evidence-based administrative and clinical decision-making; and (c) provide data to resolve public policy and clinical dilemmas in patient care delivery influenced by nurse staffing and quality [45]. Nursing Outcomes Classification (NOC) is another sensitive, comprehensive and standardized classification of patient/client outcomes developed in the US. It evaluates the effects of nursing interventions affected by variable factors of the work environment. There are 385 NOC outcomes in NOC [46]. In the UK, the Association of UK University Hospitals (AUKUH) has identified the AUKUH Nurse Sensitive Indicators (NSI) which are quality indicators linked to nurse staffing issues, including leadership, skill-mix and training and staff development [47]. AUKUH NSI consists of six patient outcomes. In Australia, there are no nationally agreed indicators for evaluating nursing performance. Duffield, et al. [12], who conducted an Australian study, extracted eleven clinical outcomes potentially sensitive to nursing (OPSN) from hospital administrative data. These eleven outcomes are associated with nurses' work in medical and surgical units across hospital types.

3.4 Challenges for Engaging Nurses in Quality Improvement Practices at the Frontline

Conceptualization of the NPE remains in an early stage of development. A mid-range theory is lacking. Validated instruments and performance measures remain, also, in evolutionary phases and require further testing and refinement. The PES-NWI appears to be the most robust instrument in relation to content, construct, concurrent and discriminate validity [48]. There are also the key challenges for measuring the impact on quality improvement activities within the NPE which are centred on the practice of nursing and associated data collection. These challenges encapsulate nursing, health care procedures, healthcare organisations and how the provision of quality nursing care can be reconciled to quantification. Such challenges may be summarised as:

1. Nursing work is largely knowledge work which in turn is invisible and therefore it is difficult to measure. Newbold (2004) points out that care pathway are directed to maximise patient throughput and minimise costs. As such they bring a focus on management and subsequent delivery of nursing care. They lack consideration of nurses' emotional labour and psychological support for patients offered during the illness experience. The invisibility of nursing labour requires quality assurance tools that "accurately detect and monitor therapeutic interaction by nurses" [49].
2. Root cause analysis of problems or quality issues may demonstrate a division between an issue and its cause. The analysis is based on the premise that clinical adverse events are caused by system errors and not by the individual. The outcome of root cause analysis procedures may be to develop plans of action to prevent adverse event occurrences [50], but such a process is often difficult to measure for its clinical impact.
3. Baseline data is not routinely captured or monitored at the ward or unit level. Its absence suggests s that nursing practice is not embedded into hospital administrative and finance datasets.
4. If data is monitored, it is usually disparate and difficult to synthesize into a comprehensive activity report as it is stored in various data bases (which often require different access codes and passwords).
5. Clinicians vary in their understandings of practice and this inconsistency creates difficulties for measuring improvement. Researchers are making great efforts to develop unified and standardized nursing language to describe the elements of nursing care across different settings for comparison and evaluation of nursing care delivered [51].
6. There is currently no agreement on what percentage of time nurses should be spending at the bedside to ensure safe and effective care delivery. Jones, et al. (2010) extend this argument further in relation to the concept of nursing time, where nursing time is associated with patient outcomes [52]. Yet, the time for activities of care, the quality of the activities and sufficiency of the activi-

ties have not been linked to outcomes. The aspect of psychological nursing time again is invisible, yet patients depend on the nurse "being there" for them. Patients are also sensitive to nurses and their experiences of time pressures, and patients can 'identify a decrease in the quality of nursing care as a consequence to increased time pressure imposed on nurses [53].

7. 'Patients' make horizontal journeys through vertical systems'. This paradox in patient care has been initially addressed by the development of integrated care pathways. However, within these integrated pathways healthcare professionals are still in control. To redress this imbalance the patient as stakeholder is included in the planning of care to produce a fully integrated pathway where no healthcare professional group has dominance. The subsequent evaluation of quality care is taken by the organisation as an action point in redesigning services [54].

4 Future Research Directions

Future research is needed to explore, describe and examine the nurse quality monitoring processes within hospital ward based settings in Australia. Research priorities are needed to create unified and standardized nurse quality monitoring and reporting that includes nursing unique health care provision in the NPE. Nursing workflow processes should be considered in the health information systems development as they make significant contributions to quality care outcomes. Specific research is needed to enhance quality monitoring reporting at the ward level to facilitate patient safety and this includes:

- Development of conceptual frameworks of the NPE through evidence-based literature reviews.
- Concept analysis of nurse sensitive indicators to synthesize and extract common meanings.
- Descriptions of current hospital ward quality monitoring processes through summaries of documents and archival records.
- Surveys of what indicators nurses perceive to be relevant to their practice that will inform the visibility and measurement of nursing work.

5 Conclusion

Key limitations concerning quality monitoring and reporting at the ward level have emerged from the literature and these include: quality reporting has not engaged nurses at the ward level; quality reports may not be meaningful for nurses at the ward level; some of the reports have been developed without proper assessment or reference to the culture that exists at the ward level. For improvement to ward based quality monitoring measurement to occur further research is required to develop agreed upon parameters of the NPE.

References

1 National Health Workforce Taskforce. Health Workforce in Australia and Factors for Current Shortages. 2009, Available at http://www.nhwt.gov.au/documents/NHWT/The%20health%20workforce%20in%20Australia%20and%20factors%20influencing%20current%20shortages.pdf.

2 Parker D, Tuckett A, Eley R, Hegney, D. Construct validity and reliability of the Practice Environment Scale of the Nursing Work Index for Queensland nurses. [Article]. International Journal of Nursing Practice.2010; 16(4): 352-8.

3 Wieck KL, Dols J, Landrum P. Retention priorities for the intergenerational nurse workforce. Nursing Forum. 2010; 45(1): 7-17.

4 Van Bogaert P, Clarke S, Vermeyen K, Meulemans H, Van de Heyning P. Practice environments and their associations with nurse-reported outcomes in Belgian hospitals: development and preliminary validation of a Dutch adaptation of the Revised Nursing Work Index. International Journal of Nursing Studies. 2009; 46(1): 54-64.

5 Flynn M, McCarthy G. Magnet hospital characteristics in acute general hospitals in Ireland. Journal of Nursing Management.2008; 16(8): 1002-11.

6 Aiken LH, Clarke SP, Sloane DN, Lake ET, Cheney T. Effects of hospital care environment on patient mortality and nurse Outcomes. [Article]. Journal of Nursing Administration.2009; 39(7/8): S45-51.

7 Aiken LH, Ball J, Rafferty A. Transformative impact of magnet designation: England case study. Journal of Clinical Nursing. 2008; 17: 3330-3.

8 Shand S, Callen J. Management information needs of clinician managers in a metropolitan teaching hospital. The HIM Journal. 2003; 31(3): 1-13.

9 Ousey K, White R. Embedding the quality agenda into tissue viability and wound care. [Ar-

ticle]. British Journal of Nursing (BJN). 2010; 19(11): S18-22.

10 Kurtzman ET, Dawson EM, Johnson JE. The current State of nursing performance measurement, public reporting, and value-based purchasing. Policy, Politics, & Nursing Practice. 2008; 9(3): 181-91.

11 Needleman J, Kurtzman ET, Kizer KW (2007). Performance measurement of nursing care. Medical Care Research & Review. 2007; 64: 10S-43S.

12 Duffield C, Roche M, et al. (2007). Glueing it together - nurses their work environment and patient safety [electronic resource]: final report NSW Department of Health.

13 Lucero RJ, Lake ET, Aiken LH. Variations in nursing care quality across hospitals. [Article]. Journal of Advanced Nursing. 2009; 65(11): 2299-310.

14 Sjetne IS, Veenstra M, Ellefsen B, Stavem K. Service quality in hospital wards with different nursing organization: nurses' ratings. Journal of Advanced Nursing. 2009; 65(2): 325-36.

15 Schubert M, Glass TR, Clarke SP, Aiken LH, Schaffert-Witvliet B, Sloane DM, et al. Rationing of nursing care and its relationship to patient outcomes: the Swiss extension of the international hospital outcomes study. International Journal for Quality in Health Care: Journal of the International Society for Quality In Health Care / Isqua. 2008; 20(4):227-37.

16 Needleman J, Buerhaus P, Stewart M, Zelevinsky K, Mattke S. Nurse staffing in hospitals: Is There a Business Case for Quality?. Health Affairs. 2006; 25(1):204-11

17 Needleman J, Buerhaus P, Mattke S, Stewart M, Zelevinsky K. Nurse-staffing levels and the quality of care in hospitals. The New England Journal of Medicine. 2002; 346(22): 1715-22.

18 Roche M, Diers D, Duffield C, Catling-Paull C. Violence toward nurses, the work environment, and patient outcomes. [Article]. Journal Of nursing scholarship. 2010; 42(1): 13-22.

19 Bruyneel L, Diya L, Aiken L, Sermeus W. Predictive validity of the international hospital outcomes study questionnaire: an RN4CAST pilot study. Journal of nursing scholarship. 2009; 41(2): 202-10.

20 Lake ET. Development of the practice environment scale of the Nursing Work Index. Research in Nursing & Health. 2002; 25(3):176-88.

21 Aiken LH, Patrician PA. Measuring organizational traits of hospitals: the Revised Nursing Work Index. Nursing Research. 2000; 49(3):146-53

22 Pearce C, Phillips C, Hall S, Sibbald B, Porritt J, Yates R, et al. Contributions from the lifeworld: quality, caring and the general practice nurse. Quality in Primary Care. 2009; 17(1): 5-13.

23 Murphy J. Nursing Informatics. The Journey to Meaningful Use of Electronic Health Records. Nursing Economic$. 2010; 28(4): 283-286.

24 Joyce J, Crookes P. Developing a tool to measure 'magnetism' in Australian nursing environments. Australian Journal of Advanced Nursing. 2007; 25(1): 17-23.

25 Smith DP, Jordan HS. Piloting nursing-sensitive hospital care measures in Massachusetts. Journal of Nursing Care Quality. 2008; 23(1): 23-33.

26 Pazargadi M, Tafreshi MZ, Abedsaeedi Z, Majd HA, Lankshear AJ. Proposing indicators for the development of nursing care quality in Iran. [Article]. International Nursing Review. 2008; 55(4): 399-406.

27 Lee B. Identifying outcomes from the nursing outcomes classification as indicators of quality of care in Korea: A modified delphi. International Journal of Nursing Studies. 2007; 44: 1021–8.

28 Head BJ, Aquilino ML, Johnson M, Reed D, Maas M, Moorhead S. Content validity and nursing sensitivity of community-level outcomes from the Nursing Outcomes Classification (NOC). [Article]. Journal Of nursing scholarship. 2004; 36(3): 251-59.

29 Allred CA, Michel Y, Arford PH, Carter V, Veitch JS, Dring R, Beason S, Hiott BJ, & Finch NJ. Environmental uncertainty: Implications for practice model redesign. Nursing Economic$. 1994; 12(6) :318-26

30 Scott, Joan Gleason, Sochalski, Julie, Aiken, Linda. Review of magnet hospital research: Findings and implications for professional nursing. Journal of Nursing Administration. 1999; 29(1): 9-19.

31 Hoffart N, Wood CQ. Elements of a nursing professional practice model. Journal of professional Nursing. 1996; 12:354-64.

32 Zelauskas B, Howers DG. The effects of implementing, a professional practice model. Journal

of Nursing Administration. 1992; 22(7/8):18-23.

33 Kramer M, Hafner LP. Shared values: impaction staff nurse job satisfaction and perceived productivity. Nursing Research. 1989; 38(3): 171-77.

34 Estabrooks CA, Tourangeau AE, Humphrey CK, Hesketh KL, Giovannetti P, Thomson D, et al. Measuring the hospital practice environment: a Canadian context revised Nursing Work Index (NWI-R). Research in Nursing & Health. 2002; 25(4): 256-68.

35 Tervo-Heikkinen T, Partanen P, Aalto P, Vehviläinen-Julkunen K. Nurses' work environment and nursing outcomes: a survey study among Finnish university hospital registered nurses. International Journal of Nursing Practice. 2008; 14(5): 357-65.

36 Gerhardt WE, VanKuiken D. Assessing magnet readiness using the nursing work index-revised survey. The Journal of Nursing Administration. 2008; 38(10): 429-34.

37 Kanai-Pak M, Aiken LH, Sloane DM, Poghosyan L. Poor work environments and nurse inexperience are associated with burnout, job dissatisfaction and quality deficits in Japanese hospitals. Journal of Clinical Nursing.2008; 17(24): 3324-3329.

38 Li YF, Lake ET, Sales AE, Sharp ND, Greiner GT, Lowy E, et al. Measuring nurses' practice environments with the revised nursing work index: evidence from registered nurses in the Veterans Health Administration. Research in Nursing & Health. 2007; 30(1): 31-44.

39 Lake ET. The nursing practice environment: measurement and evidence. Medical Care Research and Review: MCRR. 2007; 64(2 Suppl): 104S-22S.

40 Cumming GG, Hayduk L, Estabrooks CA. Is the Nursing Work Index measuring up?. Nursing Research. 2006; 55(2): 82-93.

41 Slater P, McCormack B. An exploration of the factor structure of the nursing work index. Worldviews on Evidence-Based Nursing / Sigma Theta Tau International, Honor Society of Nursing. 2006; 4(1): 30-9.

42 Lake ET, Friese CR. Variations in nursing practice environments: Relationship to staffing and hospital characteristics. Nursing Research. 2006; 55(1): 1-9.

43 Chaboyer W, Johnson J, Hardy L, Gehrke T, Panuwatwanich K. Transforming care strategies and nursing-sensitive patient outcomes. Journal of Advanced Nursing. 2010; 66(5): 1111-19.

44 American Nursing Association. Nursing sensitive indicators. Available at: www.nursingworld.org/MainMenuCategories/ThePracticeofProfessionalNursing/PatientSafetyQuality/Research-Measurement/The-National-Database/Nursing-Sensitive-Indicators_1.aspx

45 Aydin, C. E., Bolton, L. B., Donaldson, N., Brown, D. S., Buffum, M., Elashoff, J. D., et al. (2004). Creating and analyzing a statewide nursing quality measurement database. Journal Of nursing scholarship, 36(4), 371-378.

46 The University of Iowa. College of nursing. Nursing Outcomes Classification (NOC). Available at: http://www.nursing.uiowa.edu/excellence/nursing_knowledge/clinical_effectiveness/noc.htm

47 The association of UK University hospital. AUKUH nursing sensitive indicators implementation Resource Pack. Available at: http://www.aukuh.org.uk/members/documents/4NurseSensitiveIndicatorsImplementationResourcePack.pdf

48 Bonneterre V, Liaudy S, Chatellier G, Lang T, Gaudemaris R. Reliability, Validity, and health Issues arising from questionnaires used to measure Psychosocial and Organizational Work Factors (POWFs) among hospital nurses: A Critical Review. Journal of Nursing Measurement. (2008); 16(3): 207-30.

49 Newbold D. Rival research programmers and their influence on nursing practice. Journal of Nursing Management. 2004; 12: 97-104.

50 Mengis J, Nicolini D. Root cause analysis in clinical adverse Events. Nursing Management. 2010; 16(9): 16-20.

51 Swan BA, Lang NM, et al. Perspectives in ambulatory care. Access to quality health care: links between evidence, nursing language, and informatics. Nursing Economic$. 2004; 22(6): 325-332.

52 Jones TL. A holistic framework for nursing time: Implications for Theory, Practice, and Research. Nursing Forum. 2010; 45(3): 185-96.

53 Teng CI, Hsiao FJ, Chou TA. Nurse-perceived time pressure and patient-perceived care quality. Journal of Nursing Management. 2010; 18(3): 275-84.

54 Campbell S, Watson B, Gibson A, Husband G, Bremner K. Comprehensive and practice development: City Hospitals Sunderland's experience of patient journeys. Practice Development in Health Care. 2004; 3(1): 15-26

Correspondence

Xiaoquan Xu

School of Nursing and Midwifery
Victoria University
PO Box 14428
Melbourne Victoria Australia 8001

Appendix

Figure 1: Comparison of three instruments to measure the nursing practice environment

Instrument	Authors	Items	Development	Advantages	Limitations
NWI (Nursing Work Index)	Kramer and Hafner (1989)	65 items organizational characteristics, including nursing job satisfaction, perceived productive, and perceptions of an environment conducive to quality nursing care	Developed from the organizational characteristics of 46 magnet hospitals which participate in the nurse survey conducted by American Academy of Nursing	A strong foundation and ideal instrument for measurement of nursing work environment	Its substantive domains were not identified empirically, nor are reference values available [20]. The number of items made it cumbersome and lengthy for respondents [21]. No subscale highlighting nurse autonomy [20].
NWI-R (revised-nursing work index)	Aiken and Patrician (2000)	57 items, 4 subscales, including autonomy, control over the work environment, relationship with physicians, and organizational support	Eliminated 10 items selected from the NWI which was less significantly related to characters of professional nursing practice environment, one item was a little modified, and 2 items was added. Retained the "presence" statement, deleted the two "value" statement. Utilized NWI-R in a research of medicare mortality rates for 39 magnet hospitals and 195 matched control hospitals to identify its reliability and validity. Used NWI-R in a 20 hospital national AIDS care study with matched control hospitals and internal control units to test its reliability and validity.	NWI-R derived from the concept of professional work environments reflects the features of nursing job satisfaction and hospital outcomes at unit and hospital level. It has been used and identified widely between different countries and hospitals [4, 5, 34, 35] The four-factor model NWI-R has been reported as an important instrument for measuring and developing a positive organizational workplace [23, 36, 37]	It includes many items which makes a heavy burden for respondents [20]. It only measures three theory-based domains of practice [38]. This lack of model fit with the data raises questions about its validity as measure of the nursing practice environment [39]. Its factor structure cannot be replicated statistically [40].
PES-NWI (Practice Environment Scale)	Lake (2002)	48 items, 5 subscale, Including: Nurse participation in hospital affairs Nursing foundations for quality of care Nurse manager ability, leadership, and support of nurse Staffing and resource adequacy Collegial nurse-physician relation	Selected 49 items from the original 65-item NWI which indicated the nursing practice environment. Tested the factors or subscales representing domains with exploratory factor analysis. Judged subscale reliability with a Cronbach's alpha criterion over 0.80. Evaluated construct validity of the subscales and the composite by comparing the scores of nurses in magnet and non magnet hospital samples. Tested generalizability of the selected subscale model by oblique multiple-group principal components cluster analysis.	The PES-NWI comprises 4 theory-based domains and contains, also, a staffing/workload domain. The less items limit the survey length and may guarantee a high response rate. The PES-NWI was chosen for the National Database of Nursing Quality Indicators (NDNQI) for measuring nursing practice environments.	It cannot cover all salient domains of NPE's [38]. Its five factor model requires improvement because of the theoretical and measurement reasons [39]. A short form of PES should be developed further [38]. A target level of the organization (hospital or nursing unit) had not been explicitly studied [20]. Its application is not as wide as the NWI-R [38].

Figure 2: Summary of nursing sensitive indicators

Author	Title	Country	Definition	Indicator list
American Nurses Association (ANA)	The National Database of Nursing Quality Indicators	USA	Nursing-sensitive indicators reflect the structure, process and outcomes of nursing care. The structure of nursing care is indicated by the supply of nursing staff, the skill level of the nursing staff, and the education/certification of nursing staff. Process indicators measure aspects of nursing care such as assessment, intervention, and RN job satisfaction. Patient outcomes that are determined to be nursing sensitive are those that improve if there is a greater quantity or quality of nursing care (e.g., pressure ulcers, falls, and intravenous infiltrations).	Nursing Hours per Patient Day Registered Nurses (RN) Hours per Patient Day Licensed Practical/Vocational Nurses (LPN/LVN) Hours per Patient Day Unlicensed Assistive (UAP) Hours per Patient Day Nursing Turnover Nosocomial Infections Patient Falls Patient Falls with Injury Injury Level Pressure Ulcer Rate Community-acquired Hospital-acquired Unit-acquired Pediatric Pain Assessment, Intervention, Reassessment (AIR) Cycle Pediatric Peripheral Intravenous Infiltration Psychiatric Physical/Sexual Assault RN Education/Certification RN Survey Job Satisfaction Scales Practice Environment Scale (PES) Restraints Staff Mix RN LPN/LVNs UAP Percent Agency Staff
The Association of UK University Hospitals	AUKUH Nurse Sensitive Indicators	UK	Nurse Sensitive Indicators refer to quality indicators that can be linked to nurse staffing issues, including leadership, establishment levels, skill-mix and training and development of staff. The NSIs used within this project have been identified as indicators of quality of care with specific sensitivity to nursing intervention or lack of.	Official Complaints: Official complaints about nursing/midwifery care/ staff received per 10,000 occupied bed days identifying the 3 areas of: Communication Clinical Care Attitude Drug Errors: Actual drug errors where nursing was the primary cause, not including near misses per 10,000 occupied bed days. Infection: Incidence rates of MRSA bacteraemia per 10,000 occupied bed days and Clostridium Difficile per 1000 occupied bed days. Slips, Trips & Falls: Number of slips, trips or falls per 10,000 occupied bed days caused primarily by nursing error. Pressure Ulcers: Incidence of hospital acquired pressure ulcers per 10,000 occupied bed days. Nutrition: Number of patients having had nutritional screening per 10,000 occupied bed days. Percentage of wards that have implemented protected meal times policy within the Trust.
Collaborative Alliance for nursing outcome	The California Nursing Outcomes Coalition (CalNOC)		CalNOC is a voluntary collaborative professional initiative with a mission to build the nursing staffing and quality database repository for resolving public policy and clinical dilemmas in patient care delivery influenced by nursing staffing and quality	Falls Pressure ulcer prevalence Restrain prevalence Hours of nursing care Skill mix Patient days RN education Patient satisfaction
Centre for Nursing Classification & Clinical Effectiveness (The Uni-	Nursing Outcomes Classification (NOC)	USA	The Nursing Outcomes Classification (NOC) is a comprehensive, standardized classification of patient/client outcomes developed to evaluate the effects of nursing interventions	The 385 NOC outcomes in Nursing Outcomes Classification (NOC) (4th ed.)

Author	Title	Country	Definition	Indicator list
versity of Iowa)				
Duffield (2007)	Glueing it together: Nurses, their environment and patient outcomes	Australia	Eleven clinical outcomes potentially sensitive to nursing (OPSN) derived from administrative data was used to measure the patient outcomes of nurses' work in medical and surgical units across hospital types using several measures	Urinary tract infection; decubitus ulcers; pneumonia; deep vein thrombosis/pulmonary embolus; gastrointestinal ulcer/gastro-intestinal bleeding; central nervous system complications; sepsis; shock; cardiac arrest; surgical wound infection; pulmonary failure; and physiological/ metabolic derangement. In addition failure to rescue (death following certain OPSN) was measured. Adverse events were also captured from patient records on the 80 wards in the cross-sectional Study.
Needleman (2002)	Nurse-staffing levels and the quality of care in hospitals	USA	Fourteen adverse outcomes were identified that are potentially sensitive to staffing by nurse	Length of stay, urinary tract infection, pressure ulcers, hospital-acquired pneumonia, shock or cardiac arrest, upper gastrointestinal bleeding, hospital-acquired sepsis, deep venous thrombosis, central nervous system complications, in-hospital death, failure to rescue, wound infection, pulmonary failure, metabolic derangement.
Lee (2007)	Identifying outcomes from the nursing outcomes classification as indicators of quality of care in Korea: A modify Delphi study	Korea	Five Nursing Outcomes Classification(NOC) nursing outcomes were identified as the five most sensitive nursing outcomes for the evaluation of nursing care in hospitals	Vital signs status, knowledge: infection control, pain control, safety behaviour: fall prevention and infection status