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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

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Abstract

Aim—To study the relationship between nurse work environment, job outcomes and nurse-assessed quality of care in the Belgian context.

Background—Work environment characteristics are important for attracting and retaining professional nurses in hospitals. The Revised Nursing Work Index (NWI-R) was originally designed to describe the professional nurse work environment in U.S. Magnet Hospitals and subsequently has been extensively used in research internationally.

Method—The NWI-R was translated into Dutch to measure the nurse work environment in 155 nurses across 13 units in three Belgian hospitals. Factor analysis was used to identify a set of coherent subscales. The relationship between work environments and job outcomes and nurse-assessed quality of care was investigated using logistic and linear regression analyses. *Results:* Three reliable, consistent and meaningful subscales of the NWI-R were identified: *nurse–physician relations*, *nurse management at the unit level* and *hospital management and organizational support*. All three subscales had significant associations with several outcome variables. *Nurse–physician relations* had a significant positive association with nurse job satisfaction, intention to stay the hospital, the nurse-assessed unit level quality of care and personal accomplishment. *Nurse management at the unit level* had a significant positive association with the nurse job satisfaction, nurse-assessed quality of care on the unit and in the hospital, and personal accomplishment. *Hospital management and organizational support* had a significant positive association with the nurse-assessed quality of care

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Ethical approval

The study was approved by the ethics committees of the three hospitals.

Conflict of interest

None declared.

in the hospital and personal accomplishment. Higher ratings of *nurse–physician relations* and *nurse management at the unit level* had significant negative associations with both the Maslach Burnout Inventory emotional exhaustion and depersonalization dimensions, whereas *hospital management and organizational support* was inversely associated only with depersonalization scores.

Conclusion—A Dutch version of the NWI-R questionnaire produced comparable subscales to those found by many other researchers internationally. The resulting measures of the professional practice environment in Belgian hospitals showed expected relationships with nurse self-reports of job outcomes and perceptions of hospital quality.

Keywords

Burnout; Job satisfaction; Nurse retention; Nurse management; Nurse work environment; Quality of care

What is already known about the topic?

- The complete Revised Nursing Work Index contains a variety of items and has demonstrated relevance for the study of nurses' work environments and their impacts on nurse job outcomes and patient outcomes.
- Organizational and managerial supports for a nurse work environment that attracts and retains professional nurses appear to be indispensable for providing high-quality care.

What this paper adds

- The Revised Nursing Work Index measures key aspects of nurses' work environment in hospitals in the Dutch-speaking region of Belgium.
- Hospital management and organizational support together with nurse management at the unit level and the nurse–physician relations are significantly associated with nurse burnout.
- Significant variability was observed at the unit level, as well as the hospital level, suggesting that the unit level has an impact on nurses' job outcomes and assessments of quality care, and that future investigations of this type should build nursing units as well as hospitals into multilevel designs.

1. Introduction

Work environments have been widely discussed as an important issue in attracting and retaining professional nurses in hospital care. Several studies in the United States have shown relationship between nurse staffing, work environment, nurse job outcome and patient outcome (Aiken et al., 2000; Cho et al., 2003; Needleman et al., 2002). Pioneering research on Magnet Hospitals suggested that a set of organizational factors influence recruitment and retention of professional nurses in hospitals and ultimately affect the quality and safety of care (McClure and Hinshaw, 2002). Magnet Hospitals were originally identified specifically for having reputations for attracting and retaining professional nurses because of their good professional nursing practice environments (Kramer and Schmalenberg, 2002). They are now designated on the basis of having implemented best practices in administration to establish sound work environments by the American Nurses' Credentialing Center (ANCC, 2005).

A number of results from European studies have been consistent with Magnet Hospital studies and other research on elements of hospitals that favour nurse retention and high-quality nursing care. A large multinational European study on the early departure from the nursing profession

(NEXT—Nurses Early Exit Study) reported substantial hospital-to-hospital differences in structure, as well as perceived working conditions and various health and behavioural outcomes (Hasselhorn et al., 2005). Study results supported connections between organizational environment and adverse nurse job outcomes such as burnout, unfavourable work ability and intention to leave nursing. Specific work environment and workforce problems identified as obstacles to provide good nursing care in another Belgian study included concerns about the quality of leadership and management, insufficient staff, time demands and stressful work environments (Milisen et al., 2006). The authors of that paper advocated work redesign to support nurses in providing comprehensive professional care.

The development of measurement tools capturing key practice environment characteristics for hospital nurses has greatly advanced research and management practice. The Nursing Work Index was originally designed to assess work environment issues related to job satisfaction and ability to provide quality care, based on the findings of early Magnet Hospital research (Kramer and Hafner, 1989). It was later initially recast as the Revised Nursing Work Index (NWI-R) for measuring aspects of professional practice environment (Aiken and Patrician, 2000) and used in a range of studies in the United States to explore differences in nurse practice environment between Magnet Hospitals and Nonmagnet Hospitals (original and ANCC-certified). Many of these studies used a set of theoretically derived subscales of the NWI-R (*autonomy, control over nursing practice, nurse–physician relations* and *organizational support*) and con-firmed the importance of certain characteristics in work environment. Lake (2002) later developed a set 5 factor analysis-derived subscales involving 30 of the NWI items and referred to them as the Practice Environment Scale of the Nursing Work Index (PES–NWI): *nurse participation in hospital affairs, nursing foundation for quality of care, nurse ability – leadership – support of nurses, staffing-resource adequacy* and *collegial nurse–physician relations*. Only the nurse–physician relations subscale appears in both sets of subscales.

In preparation for this study, a search of the PubMed (www.nlm.nih.gov) database was conducted using nursing professional practice, nurse work environment, nurse job outcome (job satisfaction, burnout and turnover), patient outcome (quality and safety of patient care) and Magnet Hospitals as keywords. English-language publications from January 2000 to May 2008 were reviewed along with a limited number of key articles before that period related to Magnet Hospitals, Nursing Work Index and burnout.

Concerns have been raised about the stability of the NWI's factor structure across datasets collected at different times and from different pools of hospital nurses (Cummings et al., 2006). Indeed, alternative subscale structures have been identified in studies in the United States (Li et al., 2007; Choi et al., 2004; Erickson et al., 2004) and Canada (Estabrooks et al., 2002) and translated versions of the instrument have been tested and used in Canada, Iceland and Switzerland (McCusker et al., 2004; Gunnarsdóttir et al., 2007; Schubert et al., 2007). Most of these studies find consistent (albeit not identical) clustering of items under common themes.

Nonetheless, over the past decade, numerous studies have established concurrent and predictive validity of the tool. Not only has it been found to distinguish magnet and nonmagnet facilities, it has also been used to explore associations between practice environment factors and nurse job satisfaction, burnout and perceptions of quality of care as well as other organizational elements (Aiken et al., 2000; Havens, 2001; Laschinger et al., 2001, 2003; Upinieks, 2002). Most recently, a number of investigators have found associations between NWI-derived factors and nurse occupational injuries with used sharps (needle-sticks) (Clarke et al., 2002a,b; Clarke, 2007) and objectively measured patient outcomes including mortality and failure to rescue in medical, surgical and oncology patients (Aiken et al., 2008; Estabrooks et al., 2005; Friese et

al., 2008; Tourangeau et al., 2007) as well as nurse reports of patient safety events (Laschinger and Leiter, 2006). Hospital nursing characteristics were investigated with the PES–NWI in association with 30-day mortality of acute medical patients (Tourangeau et al., 2007) and with 30-day mortality and failure to rescue (death following a complication) of surgical oncology patients (Friese et al., 2008), supporting the hypothesis that poor nurse practice environment has an impact on the quality and safety of patients.

The NWI (with PES scoring) was selected in 2004 by the National Quality Forum (NQF) as a Nursing Care Performance Measure and in 2006 the National Database of Nursing Quality Indicators, one of the largest nursing outcomes data warehousing effort for hospitals in the world began to offer participating institutions the option to use the instrument as part of its annual nurse survey (Lake, 2007). Because of its intuitive appeal and acceptability to many nurses and researchers worldwide despite linguistic and cultural differences, and its performance in a variety of small and large scale research projects, despite lingering controversies about its factor structure, the NWI remains the best-validated and most extensively used measurement tool for research investigating practice of the nurse practice environment internationally. It was therefore selected for the present study, an investigation of the relationship between nurse work environment, job outcomes and nurse-assessed quality of care in Belgian Hospitals.

2. Methods

This multicenter pilot study was conducted in November 2005 in three Belgian hospitals located in a region known for a high level of competition among employers for nurse labour. Staff nurses ($n = 195$) from 13 hospital units were invited to voluntarily complete an anonymous questionnaire. In each hospital a single contact person took responsibility for the distribution and collection of the questionnaire over a 3-week period. Medical, surgical and surgical intensive care units were included. In two general hospitals (398 beds and 231 beds) the study was conducted in two medical units (pulmonology and neurology) and three surgical units (orthopaedics, general surgery and intensive care). In one university hospital (573 beds) the study was conducted in one medical unit (pneumology) and two surgical units (orthopaedics and intensive care unit).

2.1. Variables and instruments

Demographic data used to describe the study population included age, gender, years in nursing, years working in the present unit, work schedules, family situation and commuting distance to the hospital.

The *Revised Nurse Work Index* (Aiken and Patrician, 2000), the most comprehensive version of the NWI used in research in the United States and Canada was chosen as the practice environment measure here. All 57 items of the original NWI-R were translated into Dutch for a study population from Flanders (Belgium) and presented in the questionnaire. The face validity of the Dutch translation of the NWI-R was verified by a staff nurse, one nurse manager, two directors of nursing and a physician and consensus on wording was achieved. The translation was then back-translated into English for validation by an academic qualified expert. Nurses were asked to rate the presence of each element on a 4-point Likert-type scale with choices from strongly disagree (1), disagree (2), agree (3) to strongly agree (4). The values were coded for data analysis so that higher numbers indicated better agreement.

A set of nurse-reported measures of job outcomes and quality of care were adopted drawing upon tools used in studies by Aiken et al. (2001, 2002). A single-item measure of job satisfaction and a second question asking about intentions to leave the current hospital within 1 year were used to measure job outcomes. In addition, two items for measuring nurse-assessed

quality of care, on the unit and in the hospital the last year were selected. Finally, the Maslach Burnout Inventory (MBI) (Maslach et al., 1996) was used to measure burnout. This standardized questionnaire with 22 items includes three validated subscales: emotional exhaustion, depersonalization and personal accomplishment. Using a 7-point rating scale (0 = never, 6 = every day) participants were asked to indicate the extent to which they agreed with each statement. High scores on emotional exhaustion and depersonalization and low scores on personal accomplishment are indicative of burnout. Drawing on her theory of burnout as a tripartite construct, Maslach suggests considering the scores for each of the three subscales separately. The translation of the MBI developed and validated by Vlerick (1996) for research in the Dutch-speaking part of Belgium (MBI-VL) was used here. While Vlerick suggested eliminating six items from the three subscales, we used the full 22-item version to collect information from all items for further analysis. In fact, the reliability and consistency (Cronbach's alpha) of the 22-item version was consistent with previous studies (Maslach et al., 1996; Schaufeli and Van Dierendonck, 2000), whereas the 16-item version of Vlerick has lower Cronbach's alpha coefficients for the depersonalization and personal accomplishment subscale and comparable Cronbach's alpha coefficient for the emotional exhaustion subscale.

2.2. Data analysis

The data analysis was performed in four stages:

- For comparisons of the results across the two sets of subscales (Aiken and Patrician, 2000; Lake, 2002), the mean scores were calculated for each respondent and the respondents as a group. Cronbach's alpha coefficient was used to assess internal consistency (reliability).
- A principal component analysis and rotation (Varimax with Kaiser Normalization) was used to identify independent subscales. Items with sufficient factor loading (>0.40) and meaningful content were selected. In addition, the subscales were tested with a second factor analysis, an inter-subscale correlation matrix and the calculation of the mean scores for each subscale. The reliability of these subscales was tested using Cronbach's alpha coefficient
- To investigate the difference between the 13 units of the three hospitals an analysis of variance (ANOVA) were performed on the newly constructed subscales and eta-squared statistics indicating the percentage of variation explained by hospital and by unit reported when the *F* tests were significant.
- Regression analyses (bivariate and multivariate) with the NWI-R subscales as independent variables and job outcome and nurse-assessed quality of care measures as dependent variables were performed. The job-related items with job satisfaction and intention to leave the current hospital, and the items of nurse-assessed quality of care on the unit and the hospital were dichotomized for performing logistic regression analyses: strongly satisfied and satisfied versus dissatisfied and strongly dissatisfied, no intention versus any intention of leaving within the next year, good and excellent versus fair and poor quality of care and remained the same and improved versus deteriorating quality of care.

Job-related items and nurse-assessed quality of care were recoded for data analysis so that higher scores indicated stronger agreement, except for intention to leave the current hospital (the result was coded inversely so that higher scores indicated an agreement with intention to stay the current hospital). Because no norms for the MBI were available for the Dutch-speaking Belgian population, linear regression analyses with mean item score as the dependent variables were performed for each of the three dimensions of the MBI.

Regression models were estimated using the independent variables (NWI-R subscales) performed two ways: as continuous variables (mean item scores for each subscale) and as categorical (dichotomous) variables. The dichotomous versions were constructed by splitting scores with the *neutral* value (2.5) as cut-off point (Lake, 2002): 1 corresponded to mean values of more than 2.5 (general agreement with the statements), and 0 corresponded to mean values of 2.5 or less (some disagreement with the statements). The results of the analyses with the continuous independent variables were comparable to those using discrete independent variables. However, the latter were reported because they were more readily interpretable (the increase/decrease in odds or coefficients associated with mean ratings agreeing vs. disagreeing that certain elements are present has a somewhat clearer meaning than a one point increase in these measures). The multivariate analyses included statistical controls for the following nurse characteristics based on the associations of each with at least one of the dependent variables: gender, additional degree or certification, years in nursing, years on the present unit and working schedules.

Statistical significance was set at $p < .05$. The Statistical Package for the Social Sciences (SPSS) Version 15.0 software was used for all analyses (Norušis, 2007).

3. Results

From the 13 hospital units, 155 (79%) of the 195 nurses approached completed the questionnaire. High response rates were obtained at the unit level: one unit had a response rate of 50%, four units had response rates between 60% and 69%, six units between 70% and 91% and two units had a 100% rate.

3.1. Descriptive analysis

Table 1 summarizes the respondents' characteristics as well as the distribution of the job-related dependent variables.

The mean age of the nurses was 35.6 years (range: 22–56). The respondents had worked an average of 12.8 years in nursing (range: 0–35) and 8.4 years (range: 0–34) on the present hospital unit. Slightly fewer than 1 in 5 was male. Almost 50% had obtained an additional degree or certification after their basic training. Only one out of eight nurses worked half-time or less, and more than 70% of the nurses worked at least on an 80% basis. One out of eight respondents was dissatisfied with the current job and almost 8% of the respondents had the intention to leave the hospital within 1 year. Of the respondents 70% assessed the quality of care at the unit level as good or excellent while more than 40% indicated that overall quality of care in the hospital the past year was deteriorating.

3.2. Subscale analysis

Following Aiken and Patrician (2000) and Lake (2002), NWI-R and PES–NWI subscales previously used in the literature were computed but only the subscale nurse–physician relations showed a Cronbach's alpha higher than 0.75. Therefore a factor analysis was performed to develop a set of subscales that were a better fit with the current dataset in terms of internal consistency. The end results of a principal component analysis and rotation (Varimax with Kaiser's Normalization) on the 57 items are displayed in Table 2. A 3-factor solution produced most internally consistent and conceptually coherent subscales. Three clear, meaningful subscales with 3, 13 and 15 items were identified.

The items were grouped into three subscales: *nurse–physician relations* (3 items), *nurse management at the unit level* (13 items) and *hospital management and organizational support* (15 items). The three subscales (Table 3) each had Cronbach's alpha coefficient greater

than 0.75. Inter-correlations of the new subscales were low enough to rule out multicollinearity should they be entered simultaneously into models ($<.35$) (Choi et al., 2004).

Mean scores for *nurse management at the unit level* and *nurse-physician relations* were above the neutral point but under a score of 3, indicating moderate agreement with the statements on average and a slightly positive overall impression regarding these elements. The average *hospital management and organizational support* subscale score was below the neutral midpoint, suggesting general disagreement with the statements in this subscale.

Analysis of variance (ANOVA) of the three subscales to determine whether there was significant shared variation at the levels of hospitals and units. Given that only three hospitals were studied, it is perhaps not surprising that only one of the subscales showed significant variation at the hospital level (*nurse management at the unit level* at $p = .004$ with 8% of variance explained by the hospitals the nurses worked in). *Nurse-physician relations* and *nurse management at the unit level* showed greater variation across than within the 13 units ($p = .05$ and $p < .001$) with 14% and 18% of variance in those measures being explained at the unit level.

3.3. Regression analysis

Logistic regression analyses explored the relationships between the three subscales of the nurse work environment as independent variables, and the job-related items with job satisfaction and intention to stay the current hospital, and the nurse-assessed quality of care on the unit and the hospital as dependent variables (Table 4). Linear regression analyses examined the relationship between the three subscales of the nurse work environment as independent variables, and the three dimensions of the MBI (Table 5).

In summary, *nurse-physician relations* had a significant positive association with the satisfaction of nurses with their current job, the intention to stay the current hospital, the nurse-assessed quality of care on the unit level, and personal accomplishment. *Nurse management at the unit level* had a significant positive association with the satisfaction of nurses with their current job, nurse-assessed quality of care on the unit and in the hospital, and personal accomplishment. *Hospital management and organizational support* had a significant positive association with the nurse-assessed quality of care in the hospital and personal accomplishment. *Nurse-physician relations* and *nurse management at the unit level* has a significant negative association with both the MBI emotional exhaustion and depersonalization dimensions, while *hospital management and organizational support* had a significant negative association only with depersonalization scores.

The bivariate associations were sustained in the multivariate models except for the relationships between *nurse management at the unit level* and job satisfaction with the current job and between *hospital management and organizational support* with emotional exhaustion, suggesting that nurse personal characteristics explained the connections between specific work environment ratings and job outcomes.

4. Discussion

The Dutch adaptation of the NWI-R, along with the subscales developed here, demonstrates favourable psychometric properties and shows expected associations with job outcomes. It appears to be a useful instrument for studying the nurse work environment in Belgium (Flanders). Three reliable, consistent and meaningful subscales of the NWI-R were identified grouping 31 items of the 57 items. The subscales were situated at three levels: *nurse-physician relations* (3 items), *nurse management at the unit level* (13 items) and *hospital management and organizational support* (15 items).

Three subscales were derived from the NWI-R. One subscale, *nurse–physician relations* was identified in previous studies (Lake, 2002; McCusker et al., 2004). The second subscale, *nurse management at the unit level* was defined because almost all items related to the nursing unit. This subscale included items that were meaningful and important in an organization at the unit level, e.g. three items relating to the unit nurse manager, in addition to items touching on the work environment issues, nurse judgment, up-to-date nursing care plans and experienced nurses. The third subscale was called *hospital management and organizational support* because almost all items related to issues on a higher organizational level. The subscale contains items that were meaningful and important in an organization, e.g. two items concerning the chief nurse executive, along with items dealing with support from and good relations with other departments, nurses who are involved in hospital and nursing committees, salary and advancement.

Consistent with factor analyses carried out by Cummings et al. (2006) and Li et al. (2007), factor analyses of data in this sample did not identify the *autonomy, control over the practice setting* and *organizational support* subscales used in some earlier studies (Aiken et al., 2000; Upiniek, 2002; Laschinger et al., 2003). In addition, a number of subscales from Lake's (2002) Practice Environment Scale with five subscales did not show internal consistency in this dataset. However, several key characteristics of the PES–NWI are fairly closely represented in the three independent subscales derived from the present study sample. For instance, factor analysis of the NWI items in a recent Icelandic sample yielded a five component structure with a subscale at the unit and a subscale at the hospital level as was seen here (Gunnarsdóttir et al., 2007).

Interestingly, the items concerning staffing levels did not load on any of the subscales in the analyses of the present sample. However, subjects here reported almost unanimous (strong) disagreement with these items to and therefore there was perhaps insufficient variation in responses in the sample.

Despite these differences in the subscales identified in some previous work, consistent with earlier research, higher scores on the subscales identified here using factor analysis predicted job satisfaction, intention to stay in one's current hospital position, nurse-assessed quality of care on the unit and the hospital, and personal accomplishment, and were inversely associated with emotional exhaustion and depersonalization. This suggests that while sampling and/or cultural differences across the various populations in which the NWI-R has been used may lead to (relatively minor) differences in the internally consistent subscales that emerge, the NWI-R identifies important practice environment characteristics that are associated with nurse retention and quality of care.

Some interesting findings emerged with respect to the level of the organization being addressed by specific questions in the tool. Effective nurse managers are sometimes those who adopt a coaching leadership style with the nurses who report to them (Demerouti et al., 2000). In contrast, nurse executives who are responsible and accountable for the overall nursing management are best placed to ensure not only that there are adequate resources, but that the policy directives encourage and support retention efforts (O'Brien-Pallas et al., 2006). Some NWI-R items refer specifically to both aspects of work environment involving unit-specific factors and to elements related to leadership at the top level of the facility and that tend to be consistent across facilities. The distinct subscales *nurse management at the unit level* and *hospital management and organizational support* that emerged in the factor analyses reflect this distinction. Two of the three subscales' scores were significant different between the 13 hospital units according to an analysis of variance (*nurse–physician relations* and *nurse management at the unit level*), and offer interesting perspectives to use the NWI-R at the unit level. The sample size of 13 units may be too low to aggregate the data for further investigation

at the unit level in relation with jobs outcome and nurse-assessed quality of care. Depending on context, it may be relevant in future work of this kind to carry out unit-level analyses related to manager support of professional nursing practice.

Based on the cut-off values of the Utrecht Burnout Scale (UBOS) derived from a Dutch-speaking study population in the Netherlands (Schaufeli and Van Dierendonck, 2000) more than 45%, 55% and 17% of the nurses in this sample reported problematic or very problematic levels of emotional exhaustion, depersonalization and personal accomplishment, respectively. According to these not validated cutoff values for the Dutch-speaking population in Belgium the degree of burnout measured with the emotional exhaustion and depersonalization subscale was remarkably high, especially in the light of the high personal accomplishment scores. Various studies have linked burnout with high job demands and insufficient job resources (Lee and Ashforth, 1996; Demerouti et al., 2000; Bakker et al., 2005). The study findings confirm associations between burnout and hospital management, unit management and nurse-physician relations. In fact, a lack of organizational and managerial support for nursing has been shown to have a pronounced effect on nursing dissatisfaction and burnout, and both organizational support of nursing and nursing staffing were directly, and independently, related to nurse-assessed quality of care (Aiken et al., 2002). Therefore hospital and unit leadership should monitor aspects of job demands and provide sufficient job resources to anticipate feelings of burnout and to sustain and ensure the quality and safety of patient care. Although the high degree of emotional exhaustion and depersonalization and a moderate to low nurse-assessed quality of care the degree of intention to leave the current hospital of the respondents was low (7.7%).

The NWI-R and PES-NWI subscale scores were comparable with scores of nonmagnet hospitals (Aiken et al., 2000; Lake, 2002) and according to the classification of Lake and Friese (2006) the study sample has a mixed practice environment. In addition, according to the new derived subscales a moderate to low agreement about the nurse-physician relationship and various organizational features at the unit level and disagreement with various organizational features at the hospital level was observed. The agreement of nurses in our study sample with the statements *enough staff get the work done* and *enough registered nurses on staff to provide quality patient care*, was very low (9% and 12%). Moreover, the agreement of nurses with the statements that they had the *opportunity to participate in policy decisions* and *are involved in the internal governance of the hospital* (e.g. *practice and policy committees*) was also very low (8%). Thus, the nurses in the current sample report similar obstacles to providing good nursing care to the ones identified in an early Belgian study, e.g. the quality of leadership and management, insufficient staff, time demands and stressful work environment (Milisen et al., 2006). Generating solutions to these nurse concerns is critical to support sound professional nursing practices and high-quality patient care.

In the Nurses Early Exit Study Belgian hospitals with low turnover rates were those that showed high levels of job autonomy, nursing leadership, organizational support and where workload and emotional demands on nurses were reasonable (Stordeur and D'hoore, 2005). The authors suggest that these findings are congruent with research findings in United States Magnet Hospitals. However, typical magnet hospital features (McClure et al., 2002), e.g. promotion opportunities for direct patient care nurses (e.g. clinical ladder), a structure of nurse counselling in the hospital organization that support nurse participation and involvement (shared governance) and a model of patient care within the nursing and hospital organization (shared value) are in general not common practice in Belgian hospitals.

Certain limitations of this study merit mention. First, the study sample was limited to 155 nurses working in 13 units of three hospitals. Future studies of larger samples of Belgian hospitals and hospital units are in order. Secondly, as has been the case in a number of smaller-scale

studies in this literature, the independent and dependent measures were all survey-derived nurse self-reports and perceptions and the correlational analyses involved linkages of the each nurses' perceptions of work environments with his or her job outcomes and perceptions of hospital quality. It is therefore important that, in addition to subjective items, objectively measured outcomes should be examined in future research. Future research should also examine staffing parameters such as nurse hours per patient-day (NHPPD), patient-to-nurse ratios, data on turnover and absenteeism, along with data on patient acuity and nurse intensity. Future research should continue to assess nurses' impressions of organizational features using surveys, include objective measures of (at a minimum) staffing on the independent variable side, and incorporate outcomes at both the unit and hospital level. They should also take the unit and hospital levels of measurement into account more explicitly. Such an approach would provide insight into the impact of the hospital organization on nurse job outcomes and patient outcome at different levels. Third, to provide clearer evidence for managers and policymakers causal relationships between variables should be further investigated either using multilevel approaches (Lake, 2006) or structural equation modelling (Stordeur et al., 2000; Laschinger and Leiter, 2006) in cross-sectional datasets or, preferably, using longitudinal and intervention designs.

5. Conclusion

The results support the use of a tool based on American Magnet Hospital research in a new European context albeit with some cautions regarding linguistic and cultural differences. This study is one in a growing line of work confirms that nurses in countries with distinctly different health care system report similar shortcomings in their work environment and the quality of hospital care. Moreover, this research points to a common set of organizational properties across hospitals internationally (including nursing management at the unit level, nurse–physician relations) have as significant predictors of nurse work experiences associated with turnover. It is clear that nursing management at different levels within hospitals must create supports for professional practice to ensure workforce stability and provide optimal care.

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Table 1Characteristics of nurses and nurse-reported outcomes ($n = 155$)

Nurse characteristics	Mean	S.D.
Age in years	35.6	9.2
Years in nursing	12.8	9.5
Years on present unit	8.4	7.4
	<i>n</i>	%
Female	125	80.6
Bachelor of science in nursing	104	67.1
Additional degree or certification	74	47.7
Worked 50% or less of a full-time position	19	12.3
Worked 75% or more of a full-time position	112	72.3
Nurse-reported outcome variables		
Dissatisfied or very dissatisfied with the current job	20	12.9
Intention to leave the current hospital within 1 year	12	7.7
The quality of care on the unit is fair or poor	45	29.0
The quality of care in the hospital has deteriorated last year	67	43.2
	Mean	S.D.
Emotional exhaustion	17.09	7.22
Depersonalization	7.71	3.83
Personal accomplishment	32.04	5.04

Table 2

Subscale of Dutch adaptation of the NWI-R derived from principal component analysis with Kaiser's varimax rotation

<i>n</i> ^a	Subscales and items	Loading
Nurse–physician relations initial eigenvalue total: 3.4—% of variance: 6.0		
2	Physicians and nurses have good working relationships	0.47
27	Much teamwork between nurses and doctors	0.55
39	Collaboration (joint practice) between nurses and physicians	0.49
Nurse management at the unit level initial eigenvalue total: 39—% of variance: 6.8		
4	A supervisory staff that is supportive of nurses	0.41
13	A nurse manager who is a good manager and leader	0.61
20	Team nursing as the nursing delivery system	0.43
24	Not being placed in a position of having to do things that are against my nursing judgment	0.42
31	A clear philosophy of nursing pervades the patient care environment	0.61
33	Working with nurses who are clinically competent	0.44
35	A nurse manager backs up the nursing staff in decision making, even if the conflict is with a physician	0.60
44	Nurse managers consult with staff on daily problems and procedures	0.49
45	The work environment is pleasant, attractive and comfortable	0.56
47	Written, up-to-date nursing care plans for all patients	0.45
51	Standardized policies, procedures and ways of doing things	0.41
52	Use of nursing diagnoses	0.57
56	Working with experienced nurses who “know” the hospital	0.64
Hospital management and organizational support initial eigenvalue total: 7.4—% of variance: 13.0		
1	Adequate support services allow me to spend time with my patients	0.52
5	A satisfactory salary	0.47
9	Opportunity for staff nurses to participate in policy decisions	0.46
10	Support for new and innovative ideas about patient care	0.49
14	A chief nursing officer is highly visible and accessible to staff	0.41
18	Praise and recognition for a job well done	0.57
23	Good relationships with other departments such as housekeeping and dietary	0.46
26	A chief nursing executive is equal in power and authority to other top-level hospital executives	0.41
29	Opportunities for advancement	0.49
32	Nurses actively participate in efforts to control costs	0.51
36	An administration that listens and responds to employee concerns	0.64
37	An active quality-assurance program	0.52
38	Staff nurses are involved in the internal governance of the hospital (e.g. practice and policy committees)	0.61
42	Staff nurses have the opportunity to serve on hospital and nursing committees	0.47
43	The contributions that nurses make to patient care are publicly acknowledged	0.45

^aOriginal numbering of NWI-R list (Aiken and Patrician, 2000).

Table 3

Subscale analysis: principal component—grouped data

	<i>n</i> items	<i>n</i> observations	Mean (range)	S.D.	Loading	Alpha ^a
Nurse-physician relations	3	154	2.66 (1.0–4.0)	0.54	0.65	0.84
Nurse management at unit level	13	137	2.77 (1.77–3.85)	0.34	0.76	0.80
Hospital management and organizational support	15	138	2.30 (1.07–3.07)	0.32	0.71	0.80

^aCronbach's alpha.

Table 4

Logistic regression analysis: job outcome and nurse-assessed quality of care (dependent variables) and subscales nurse work environment (independent variables)

	Unadjusted		Adjusted ^a		
	OR	95% CI	OR	95% CI	
		Lower	Upper	Lower	Upper
Satisfaction with the current job ^b (n = 153)					
Nurse-physician relations ^c	7.7*	2.6	22.7	2.6	29.6
Nurse management at the unit level ^c	3.6**	1.3	10	0.9	9.0
Hospital management and organizational support ^c	6.5	0.8	51	0.9	65.1
Intention to stay the hospital ^d (n = 154)					
Nurse-physician relations ^c	4.4*	1.3	15.4	1.4	25.0
Nurse management at the unit level ^c	2.3	0.6	8.4	0.4	7.6
Hospital management and organizational support ^c	3.1	0.4	25.6	0.3	26.6
The quality of care on the unit ^e (n = 154)					
Nurse-physician relations ^c	8.5*	3.9	18.6	3.3	17.5
Nurse management at the unit level ^c	4.4*	1.8	10.8	1.9	13.0
Hospital management and organizational support ^c	1.8	0.7	4.5	0.8	6.3
The quality of care in the hospital the past year ^f (n = 153)					
Nurse-physician relations ^c	2.0	1.0	3.9	0.8	3.8
Nurse management at the unit level ^c	4.4*	1.7	11.3	1.5	11.0
Hospital management and organizational support ^c	3.3*	1.4	8.0	1.5	11.9

* p < .01;

** p < .05;

OR: odds ratio.

^a Adjusted for years in nursing – years on present unit – gender, additional degree or certification and work schedules.

^b Strongly satisfied or satisfied (1) vs. dissatisfied or strongly dissatisfied (0).

^c Mean value more than 2.5 (1) vs. mean value 2.5 or less (0).

^d Yes (1) vs. no (0).

^e Good or excellent (1) vs. fair or poor (0).

^f Improved or remained the same (1) vs. deteriorated (0).

Table 5

Linear regression analysis: burnout (dependent variables) and subscales nurse work environment (independent variables)

	Unadjusted		Adjusted ^a	
	<i>B</i>	S.E.	<i>B</i>	S.E.
Emotional exhaustion ^b (<i>n</i> = 153)				
Nurse–physician relations ^c	–33.9*	1.2	–33.7*	1.2
Nurse management at the unit level ^c	–33.6**	1.6	–33.3*	1.6
Hospital management and organizational support ^c	–32.3	1.4	–32.8*	1.4
Depersonalization ^b (<i>n</i> = 151)				
Nurse–physician relations ^c	–31.2	0.7	–30.9	0.7
Nurse management at the unit level ^c	–31.1	0.8	–31.0	0.9
Hospital management and organizational support ^c	–32.0*	0.8	–32.4*	0.8
Personal accomplishment ^b (<i>n</i> = 153)				
Nurse–physician relations ^c	3.5*	0.8	3.2*	0.8
Nurse management at the unit level ^c	2.7**	1.1	3.1*	1.1
Hospital management and organizational support ^c	2.1**	1.0	2.7*	1.0

* $p < .01$;

** $p < .05$;

B: beta coefficient; S.E.: standard error.

^a Adjusted for years in nursing – years on present unit – gender, additional degree or certification and work schedules.

^b Mean value.

^c Mean value more than 2.5 (1) vs. mean value 2.5 or less (0).