



## Hospital organizational factors influence work–family conflict in registered nurses: Multilevel modeling of a nation-wide cross-sectional survey in Sweden



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### ABSTRACT

**Background:** The present shortage of registered nurses (RNs) in many European countries is expected to continue and worsen, which poses a substantial threat to the maintenance of healthcare in this region. Work–family conflict is a known risk factor for turnover and sickness absence.

**Objective:** This paper empirically examines whether the nurse practice environment is associated with experienced work–family conflict.

**Design:** A multilevel model was fit with the individual RN at the 1st, and the hospital department at the 2nd level using cross-sectional RN survey data from the Swedish part of RN4CAST, an EU 7th framework project. The data analyzed here is based on a national sample of 8356 female and 592 male RNs from 369 hospital departments.

**Results:** We found that 6% of the variability in work–family conflict experienced by RNs was at the department level. Organizational level factors significantly accounted for most of the variability at this level with two of the work practice environment factors examined, staffing adequacy and nurse involvement in hospital affairs, significantly related to work–family conflict. Due to the design of the study, factors on ward and work group levels could not be analyzed, but are likely to account for additional variance which in the present analysis appears to be on the individual level, with private life factors likely explaining another major part.

**Conclusion:** These results suggest that higher level organizational factors in health care have a significant impact on the risk of work–family conflict among RNs through their impact on the nurse practice environment. Lower level organizational factors should be investigated in future studies using hierarchical multilevel sampling.

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### What is already known about the topic?

- A number of studies have shown that RNs' work is associated with perceived imbalance between work and family life.
- High perceived conflict between work and private life has been identified as cause of RN turnover.

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## What this paper adds

- Our study suggests that higher level organizational factors are of importance in explaining work–family conflict among RNs.
- Management on all levels should consider increasing the possibilities for RNs to impact on hospital affairs and providing adequate staffing to achieve improved work environment and facilitate a good balance between work and private life among employees.

## 1. Introduction

The present shortage of registered nurses (RNs) reported in EU countries is expected to worsen in the coming years. This is in part due to the aging of the nursing workforce in conjunction with increased health care demands as the population ages, but also loss of practicing RNs from ill-health and job dissatisfaction (Simeons et al., 2005). One important measure to maintain the current level of RNs and counteract further shortages is to keep RNs healthy and willing to continue to work. A crucial factor for a healthy and stable RN work force is the work practice environment, with numerous studies elucidating important factors affecting health and intention to leave, e.g. poor nurse–physician relations, insufficient resources (i.e. poor staffing), poor collegial relationships and poor leadership (Aiken et al., 2012; Estryng-Mehar et al., 2007; Vahey et al., 2004). Several studies describe associations between RNs' perception of their practice environment and nurse outcomes such as burnout, job satisfaction, RN reports of quality of care, turnover intention, as well as patient outcomes such as mortality and failure to rescue (van Bogaert et al., 2010).

These are known factors which can contribute to RN shortages, but the influence of work–family conflict has been less studied in relation to this issue. This is notable as many characteristics of work situations common among RNs have been identified as increasing the risk for a conflict between work and family demands. For example, long working hours and shift work have been found to be related to work–family conflict (Carlson, 1999; Carlson and Perrewe, 1999; Peeters and de Jonge, 2004; van der Heijden et al., 2008), but also jobs with interdependence and responsibility for others (Dierdorff and Kemp Ellington, 2008). Low job satisfaction and high perceived work–family conflict have previously been identified as causes of nursing staff turnover (Schacklock and Brunetto, 2012), whereas incompatibility of family and work obligations has been found to be a major barrier for the return of physicians from non-clinical positions into hospital work (Fuss et al., 2008). Most studies of work–family conflict focus on an individual perspective and multi-level analyses are rare, as are data examining work–family conflict within health professions (Fuss et al., 2008). Furthermore, while some work practice environment research has considered the shared experiences of nurses in particular units or hospitals, many studies have been restricted to consideration of correlations between individual nurses' ratings of their workplace (van Bogaert et al., 2010). Finally, since many decisions regarding the work practice environment

for nursing care are made at different organizational levels (e.g. ward, department or hospital), it may be important to understand how various factors at different levels influence the variability in work–family conflict, but to the best of our knowledge, no studies have examined this to date.

The purpose of this article is to complement the extant literature by applying a multilevel modeling framework to simultaneously explore how factors both at the hospital department and individual level impact on the balance between work and family life among RNs in Sweden. We assumed that factors at higher organizational levels have a significant impact on work–family conflict that is independent of factors closer to the individual. This can best be tested in a multilevel framework by separating the total variability into RN level and department level variability.

## 2. Methods

### 2.1. Study population

The present data comes from the Swedish portion of a 15-nation EU 7th Framework project, RN4CAST, focusing on RNs working in surgical and medical inpatient care and with a multilevel structure with nurses nested within departments and departments nested within hospitals. In Sweden, nurses were approached through hospitals but via the Swedish Association of Health Professionals (covering approximately 80% of all clinically-active nurses). From the member register all nurses working in medical and surgical departments were selected ( $N=33,083$ ). The survey questionnaire was distributed by post in February 2010 through Statistics Sweden administration. At the end of the data collecting period 23,087 surveys were returned. Those RNs who responded, but did not meet the inclusion criteria (not working in in-patient care or change of work place) have been excluded from the final database. The available Swedish database consists of self-reported survey data from 11,015 RNs working with direct in-patient medical/surgical care in 72 acute care hospitals in Sweden (response rate about 70%, internal attrition 2–3% per item), complemented with organizational data. The details of the survey design can be found elsewhere (Sermeus et al., 2011). All departments with fewer than 10 respondents and all hospitals with fewer than 3 departments were omitted in order to get correct group-level variance estimates from the multilevel model (Maas and Hox, 2005), giving a final analytic sample of 8948 RNs from 369 departments in 53 hospitals. The study was approved by the relevant Research Ethics committee (Regionala etikprövningsnämnden i Stockholm: Dnr 2009/1587-31/5). Informed consent was obtained by all respondents.

### 2.2. Individual RN and department-level measures

The individual-level variables included were: age, sex, job satisfaction, baccalaureate degree in nursing, and years of work experience as RN. Job satisfaction was measured by a single question with four response options ranging from 'very dissatisfied' to 'very satisfied'. Due to a skewed distribution with only 0.86% of the nurses very dissatisfied with their job, for analyses responses were dichotomized

**Box 1.** Examples of nursing working environment questions used in department level scale.

1. *Nursing Impact on Hospital Affairs:* The extent to which RNs feel they have an impact on overall hospital administration [8 items]. For example:

- Opportunity for RNs to participate in policy decisions.
- RNs are involved in the internal governance of the hospital.
- A chief nursing officer who is highly visible and accessible to staff

2. *Nursing Care Model:* RNs' perceptions that the hospital supports a nursing model of care [9 items]. For example:

- Active staff development or continuing programs for RNs.
- A clear philosophy of nursing that pervades patient care environment.
- Working with nurses who are clinically competent

3. *Leadership and Support for RNs:* key elements of leadership [4 items]. For example:

- A supervisory staff that is supportive of RNs.
- An RN manager who is a good manager and leader.

4. *Staff Adequacy:* RNs' evaluation of the adequacy of resources to meet demands [4 items]. For example:

- Enough RNs on staff to provide quality patient care.
- Enough staff to get the work done.

5. *Nurse–physician Relationship:* The quality of working relations between doctors and RNs in the hospital [7 items]. For example:

- Physicians value RNs observations and judgments.
- A lot of team works between RNs and physicians.

into satisfied and dissatisfied. Work environment on department level was measured by the Practice Environment Scale of the Nursing Work Index (PES-NWI), a validated and commonly used tool for investigating the nurse practice environment (Aiken et al., 2012). The PES-NWI consists of five subscales, including nurse participation in hospital affairs, collegial nurse–physician relations, nurse manager ability, leadership and support of nurses. Responses to items use a 4-point scale ranging from 'strongly disagree' to 'strongly agree'. The number of items with examples is presented in Box 1. These five summated sub-scales were aggregated at the department level by taking the average of each summated sub-scale within each department; these were seen as reflecting perceptions about work practice environment shared by RNs in the same department. The details of the methods for aggregation are provided below (Bliese, 2000; Bliese and Halverson, 2002; Cohen et al., 2001; James et al., 1993; LeBreton and Senter, 2008).

### 2.2.1. Outcome: work–family conflict

The primary outcome of interest, work–family conflict, was assessed by responses to two questions: 'To what extent do you feel that your work affects your private life in a negative way?' and 'To what extent do you feel that your

work affects your private life in a positive way?' (i.e. work–family enhancement). Response alternatives ranged from 1 = "to a very great degree", through 5 = "to a very small degree". The item on work-to-family conflict used here is similar to the one used in the QPS Nordic, which has a test-retest reliability of 0.56 (Dallner et al., 2000). We summated responses to both questions after reversing the coding of the first item, to yield a scale ranging from 2 (most positive influence of work on private life) to 10 (most negative influence). The distribution of this sum-scale was graphically checked and normally distributed according to qq-plot. Cronbach's alpha was 0.62. This summated scale does not affect the order of the scores, rather only extends the number of categories to approximate the outcome variable as continuous, thereby minimizing the bias in treating it as a continuous variable (Bollen and Barb, 1981).

## 2.3. Analyses

### 2.3.1. Multilevel model

Multilevel models are increasingly used to understand the contribution of sources of variation at different levels of organization in the health service (Zaslavsky, 2007). A two-level continuous random intercept model with RNs nested within departments was applied to explore the variability explained by individual and department level variables taking the correlated structure of data into account (Goldstein, 1995). Let  $Y_{ij}$  be the continuous response on work–family conflict for the  $i$ th nurse in the  $j$ th department, then a two-level model is represented as,

$$Y_{ij} = \beta_{0i} + \beta_{1j} + \sum \beta_{ij}X_{ij} + e_{ij} \quad (1)$$

$$\beta_{0j} = \gamma_{00} + u_{0j} \quad (2)$$

$$\beta_{1j} = \gamma_{10} \quad (3)$$

The error terms  $e_{ij}$  and  $u_{0j}$  are uncorrelated such that  $e_{ij} \sim N(0, \sigma^2)$  and  $u_{0j} \sim N(0, \tau_{00})$ ,  $\gamma_{00}$  is the average work–family conflict score over departments,  $\tau_{00}$  represents variation in work–family conflict between departments and  $\sigma^2$ , the variation among nurses within departments. To make interpretations more meaningful the nurse level variables are centered to their respective grand means (Kreft Ita et al., 1995). Model assessment in terms of variation in work–family conflict is explained by covariates at the two levels with reference to the empty or null model:

$$Y_{ij} = \beta_{0j} + e_{ij} \quad (4)$$

As the objective was to understand variability in the outcome shared by different levels of hierarchy in the data and to identify significant variables explaining the variability at each level, we specified three models: unadjusted, adjusted for individual-level variables (i.e. age, sex, job dissatisfaction, baccalaureate degree in nursing, years of experience as RN), and fully adjusted for both individual and department level variables (NWI-PES variables). We also calculated variance partition

coefficients for the outcome, representing the proportion of the total variance in the outcome attributable to differences occurring at each level along with confidence intervals (Salisbury et al., 2010). A higher value at the department level indicates that more of the variation in the outcome is due to differences between departments rather than between RNs or lower organizational levels such as wards or workgroups. We first calculated variance partition coefficients in a model with random intercept at the department level without any explanatory variables (raw coefficients), and then after adjustment for individual level characteristics (RN adjusted coefficients), and finally after additional adjustment for characteristics at the department level (fully adjusted coefficients). Finally, a separate set of three level models incorporating hospital level variables, i.e. whether the hospital is in rural/urban area and size of hospital, were performed. For clarity only the null and full models are shown. The coefficients from the adjusted models show the relationship between each included explanatory variable and the outcome; and the differences between the raw and adjusted models show the extent to which the explanatory variables explain variation in the outcome. Comparisons of the competing models were done with likelihood ratio tests in the form of deviance; the smaller the value the better the model. All models were fitted using the *xtmixed* command in STATA-12 (Stata Corporation, 2012).

### 2.3.2. Data aggregation at department level

In this analysis we do not have variables at the department level. However, there are certain variables which are more meaningful to operationalize at a higher level by aggregating at the department level. We argue that aggregation should not invariably be guided by empirical results; the decision has to be guided mostly by conceptual feasibility in terms of nursing organization. We decided to aggregate data on department level because it could be difficult for RNs to truly judge phenomena on the hospital level. Also their ratings on questions worded with “hospital” might still mostly reflect their experiences at the department, ward, or even work group level. Further, we assumed that the perceived influence of work on private life would be shared to a greater degree within a smaller work group (e.g. unit or department) than within a larger work group (e.g. hospital). Consequently, we operationalized and aggregated the variables at the department level. Empirical justification of such aggregation can be achieved by determining both the degree to which individuals within a department (within-department agreement) and the degree to which departments varied on these summated scores (between-department variability) (Chan, 1998). In this paper we measured within-department agreement by the index,  $r_{WG(j)}$  (James et al., 1993). The cut-off for this scale is 0.70 and it is assumed that the response follows a uniform distribution. But this value tends to increase as the number of items increase; Cohen et al. (2001) therefore suggested considering the cut-off criteria based on simulation and we followed their procedure. The between-department analysis was completed by using two indices, ICC(1), ICC(2) suggested by Bliese

(2000). The ICC(1) represents the proportion of variance in the target variable that is accounted for by group membership, whereas higher values of ICC(2) indicate reliable between-group differences. However, the assumption of uniform distribution in the calculation of  $r_{WG(j)}$  is not feasible in most of applications and has been criticized by many researchers (LeBreton and Senter, 2008). To strengthen our conclusion we have used another agreement index suggested by Bliese and Halverson (2002) called Random Group Resampling (RGR). This index (a) uses random group resampling to create pseudo groups and calculate pseudo group variances, (b) estimates actual group variances, and (c) performs tests of significance to determine whether actual group and pseudo group variances differ. Aggregation was done using the *multilevel* package in R (Bliese, 2009; R Development Core Team, 2012).

### 3. Results

In our sample, 14% of RNs experienced a high/very high degree of work–family conflict along with a low/very low degree of work–family enhancement. The proportion of RNs experiencing this combination of high work–family conflict and low enhancement within each department ranged from 0% to 60%, indicating large variability between departments. Descriptive statistics of individual and department level variables included in the model are shown in Table 1. The mean age of participants was 41 years, with the sample highly skewed regarding sex, as only 7% of the RNs were male. All the summated subscales had sufficient internal consistency with Cronbach’s alpha coefficients well above 0.70.

The results of the various aggregation tests for each summated scale assumed to operate at the department level are summarized in Table 2. The five dimensions of the PES-NWI were based on scores aggregated at the department level. Overall, all summated scales met statistical criteria for aggregation, indicating that they can be considered as organizational level variables.

Table 3 shows that 6.1% of the variance in work–family conflict was related to differences between departments, and the remaining 93.9% to variance at lower levels, which includes differences between individual RNs’ perceptions and random error, as well as organizational factors below department level. After inclusion of information about characteristics at the individual level, the total amount of unexplained variation decreased to some extent with 4.7% and 85.6% unexplained variance at department and individual levels respectively. However, further adjustment for department-related variables substantially reduced the unexplained variance due to differences between departments to 1.1%, but the corresponding variance at the individual level did not change much (85.5%). This indicates that department level work environment factors impact on the experienced work–family conflict of RNs.

Table 4 provides details of the relationships between the explanatory variables at the individual and department levels and the outcome in the three models. In terms of deviance statistics, Model-III is preferred and thus is the

**Table 1**  
Nurse and department level descriptive statistics.

Variables	Mean (%)	Min, max	SD	Percentiles		Reliability <sup>b</sup>
				25th	75th	
<i>Nurse level variables</i>						
Age (years) <sup>a</sup>	41.0	22, 67	11.1	31.0	49.0	–
Male (%)	6.6	–	–	–	–	–
Job dissatisfaction (%)	6.3	–	–	–	–	–
Baccalaureate degree in nursing (%)	58.7	–	–	–	–	–
Career experience as RN (years) <sup>a</sup>	11.7	0, 43	10.5	4.0	17.0	–
<i>Department level variables (aggregated)</i>						
Staff adequacy <sup>a</sup> [range: 4–16]	9.3	5.7, 12.6	1.3	8.4	10.2	0.78
Nursing impact on hospital affairs <sup>a</sup> [range: 8–32]	17.9	11.1, 24.6	1.9	16.6	19.3	0.81
Nursing care model <sup>a</sup> [range: 10–36]	23.9	17.5, 31.0	1.9	22.6	25.1	0.74
Leadership and support for nurses <sup>a</sup> [range: 4–16]	10.9	7.3, 13.8	1.1	10.2	11.5	0.76
Nurse–physician relationship <sup>a</sup> [range: 7–28]	20.6	15.4, 25.3	1.4	19.8	21.5	0.89

<sup>a</sup> Mean values.

<sup>b</sup> Cronbach's alpha.

**Table 2**  
Aggregation test results for department-level variables.

Scale variables	Within-group agreement		Between-group variance		RGR on scale scores		
	$r_{WG(j)}$	95th percentile	ICC(1)	ICC(2)	Observed variance	Pseudo variance	z
Staffing	0.55	0.44	0.21(7.57) <sup>*</sup>	0.87	0.31	0.41	–14.57 <sup>*</sup>
Nursing impact	0.57	0.55	0.19(5.82) <sup>*</sup>	0.83	0.21	0.26	–10.35 <sup>*</sup>
Nursing Model	0.56	0.53	0.18(5.87) <sup>*</sup>	0.83	0.17	0.21	–11.40 <sup>*</sup>
Leadership	0.56	0.44	0.15(5.14) <sup>*</sup>	0.80	0.31	0.37	–10.05 <sup>*</sup>
Relationship	0.69	0.55	0.12(4.26) <sup>*</sup>	0.76	0.23	0.26	–7.04 <sup>*</sup>

Note: figures in parentheses are *F*-values.

\*  $p < 0.05$ .

basis for interpretations. This model, in combination with Table 3, shows that several factors were statistically significantly associated with the outcome. Higher age and male sex were significantly associated with lower work–family conflict. Job dissatisfaction and longer experience as a RN were significantly associated with higher work–family conflict score. However, only two of the higher level variables were significantly associated with the outcome although the higher level variables reduced the unexplained variability. Thus adequate staffing and RN participation in hospital affairs were significantly associated with lower work–family conflict scores.

A separate set of three-level models was also fitted with random intercepts at both department and hospital levels.

Incorporating hospital level variables, indicated that only about 2% of the variability in work–family conflict was between hospitals, with no included hospital level variables showing a statistically significant relationship with work–family conflict (results not provided).

#### 4. Discussion

In the present study we explored the influence of both individual and department-level features of the nurse practice environment on work–family conflict. It seemed feasible that factors at higher organizational levels would have a significant impact on work–family conflict, an impact that is independent of factors closer to the

**Table 3**  
Explained and unexplained variance at department and nurse level for the outcome, before and after adjustment for explanatory variables.

Outcome	Total variance	Estimated variance (95% CI) as percentage of the total variance in work–family conflict			
		Between department		Nurse plus random	
		Unexplained	Explained	Unexplained	Explained
<i>Work family conflict</i>					
Unadjusted	2.896	0.0(0.0–0.0)	6.1(4.7–7.6)	0.0(0.0–0.0)	93.9(91.1–96.6)
Adjusted for nurses' characteristics <sup>a</sup>	2.616	1.4(1.2–1.6)	4.7(3.5–6.0)	8.3(8.1–8.6)	85.6(83.0–88.2)
Adjusted for nurse and department variables <sup>b</sup>	2.509	5.0(4.1–5.8)	1.1(0.5–1.8)	8.4(8.1–8.6)	85.5(82.9–88.1)

<sup>a</sup> Adjusted for age, sex, job dissatisfaction, degree in nursing, career experience as RN.

<sup>b</sup> Adjusted for age, sex, job dissatisfaction, degree in nursing, career experience as RN, staff adequacy, nursing impact on hospital affairs, nursing care model, leadership and support for nurses, and nurse–physician relationship.

**Table 4**  
Estimates for multilevel models as a function of nurse and department level variables.

Fixed effect	Model I: unadjusted	Model II: adjusted for RN characteristics	Model III: adjusted for RN and department characteristics
<i>Nurse level</i>			
Intercept	5.857 <sup>*</sup> (0.029)	5.713 <sup>*</sup> (0.037)	8.309 <sup>*</sup> (0.311)
Age (in years)		−0.011 <sup>*</sup> (0.003)	−0.012 <sup>*</sup> (0.003)
Male		−0.157 <sup>*</sup> (0.069)	−0.136 <sup>*</sup> (0.069)
Job dissatisfaction		2.006 <sup>*</sup> (0.070)	1.983 <sup>*</sup> (0.069)
Degree in nursing		0.046(0.043)	0.036(0.043)
Career experience as RN(in years)		0.004(0.003)	0.005 <sup>*</sup> (0.003)
<i>Department level</i>			
Staff adequacy			−0.280 <sup>*</sup> (0.026)
Nursing impact on hospital affairs			−0.068 <sup>*</sup> (0.032)
Nursing care model			−0.004(0.027)
Leadership and support for nurses			−0.016(0.025)
Nurse–physician relationship			0.001(0.015)
Deviance	34,671.46	33,100.53	32,896.60
$\chi^2$ test of change in deviance	–	1570.93 <sup>***</sup>	203.93 <sup>***</sup>

Note: figures in parentheses are S.Es of estimates; RN: registered nurse.

\*  $p < 0.10$ .

\*\*  $p < 0.05$ .

\*\*\*  $p < 0.001$ .

individual. In line with this, we have been able to show that 6% of the variability in work–family conflict is attributable to the department-level or higher, indicating that a significant variation in work–family conflict exists between departments. Staffing adequacy and RN involvement in hospital affairs were significantly related to lower work–family conflict.

This study is based on a large nationally representative sample of RNs nested in departments in hospitals. We have not reported hospital level analyses as we lack detailed information at this level, and as a separate set of three level models (results not shown) incorporating hospital level variables indicated that only about 2% of the variability in work–family conflict was between hospitals, with no included hospital level variables showing a statistically significant relationship with work–family conflict. Work–family conflict was instrumentalized using a sum-scale including both work–family conflict and work–family enhancement. Although not tested for validity, we consider the measure to be useful as the bias was minimized by treating it as a continuous variable and the distribution was normally distributed. Another factor to consider when assessing the importance of the results is that our study is limited to a single occupation in the health care sector. This means that the variability in the work context is limited, giving more scope for individual factors, which could lead to an underestimation of the importance of organizational factors. On the other hand this also limits confounding from differences between occupations and economic sectors, which could otherwise lead to spurious results at higher levels. An analysis based on multiple occupations would be likely to have shown a larger influence of higher organizational levels. In light of this, we believe that the present analysis gives significant support to the idea that organizational policies and managerial decisions can have a substantial impact on the modifiable aspects of work–family conflict.

This study has also shown the usefulness of multilevel modeling in exploring various sources of variation. Over

the years this method has been widely used in education research and has been increasingly adopted in health services research (Salisbury et al., 2010; van Bogaert et al., 2012). By taking the hierarchical nature of the data into account, this study has been able to provide estimates of the influence of individual RNs' and departmental characteristics on perceived work–family conflict. Measures on the department level were all aggregations of individual responses. Our analyses, however, show significant within-group agreement in all the aggregated summated variables and all the summated scales met the criteria for aggregation at the department level for use in further analysis. It might be argued that some of the items in the PES-NWI represent nurses' perceptions about hospital-level matters rather than those at departmental level and thus scores should be aggregated at hospital level. However, when we compared aggregation on the hospital-level to aggregation at department level we found that the Z statistics were stronger for the aggregation at the department level (results not shown). Thus, we argue that aggregation at department level is adequate.

Differences in perceived work–family conflict are likely to be highly dependent on individual factors and private circumstances such as family structure, caring responsibilities, and the size and quality of a person's social network (Byron, 2005). But many work-related factors also obviously influence the impact that a job is likely to have on private life, e.g. working hours, physical and mental demands of the job, level of responsibility, and availability of practical and social support, as well individual factors such as education, work experience, and level of seniority (Byron, 2005; Carlson, 1999; Carlson and Perrew, 1999). Characteristics of the work group are also likely to have importance, such as staffing level, competence of colleagues, and the social climate at work, as well as the individual's own relationship with key colleagues. Many of these factors mentioned above are beyond the scope of employer responsibility and may not be very amenable to change, whereas other work-related factors might be

influenced by policies and managerial decisions at different organizational levels. To show how these work-related factors impact on work–family conflict seems particularly important in a time characterized by increasing shortage of RNs. The observed 6% variation attributed to the department level may seem modest; however, this should be seen as a probable underestimation, for several reasons. First, as mentioned above, a large part of work–family conflict should be explained by private life factors, as marital status and number and age of children, and only a rather small proportion can be explained by higher-level factors. Second, the department level might be too rough a category to catch important variation in the work-environment, as many important decisions for RNs' work environment, e.g. detailed work organization, scheduling of shift rotation, and support from the first-line manager may be determined at the ward, unit or work group level. Future research should therefore also study the influence of lower level organizational factors as i.e. ward and work group as well as investigate factors in private life, e.g. family composition and working hours. Third, all Swedish hospitals share features of the work-environment that are influenced by national policies and trade union agreements, e.g. maximum working hours, length of vacation, etc. In combination, this suggests that true variability at the workplace is somewhat greater than what we report here. This interpretation of the results is supported by other studies which show the importance of group-level factors on stress outcomes. For example, a study examining the crossover specificity of team-level stressors to individual-level work–family conflict among Dutch municipality workers found a negative association of team-level emotional job demands on work–family conflict (van Emmerik and Peeters, 2009). To our knowledge the effect of the nurse practice environment on work–family conflict has not been studied yet. However, van Bogaert et al. (2010, 2012) found that higher unit-level ratings of three nurse practice environment dimensions (i.e. nurse–physician relations, nurse management at unit level and hospital management and organizational support) were significantly associated with lower levels of burnout. In our study staffing adequacy and RN involvement in hospital affairs showed a weak but significant relationship to lower work–family conflict. The small coefficients might suggest a rather low impact in practice. As stated above however, there are many other factors at work potentially influencing the experience of work–family conflict which we were not able to account for in the current study. Three sub-scales (i.e. care model, leadership, and nurse–physician relationship) did not significantly influence work–family conflict. One possible explanation could be that some of these factors work on lower organizational levels, e.g. the ward. It is for instance feasible to assume that leadership was assessed by the RNs while visualizing their line manager. It has also been previously shown that the informal organizational culture, working on a lower organizational level, is of more importance in affecting work–private life balance than formal policies formulated on higher organizational levels (Hammer et al., 2007). Adjusting for RNs' characteristics reduced the variability in work–family conflict between departments to some

degree. Younger and female RNs experience a stronger negative impact of working life on family life as compared to their older and male counterparts. This is in line with earlier findings, although the evidence is inconsistent as to whether men and women report differences in levels of work–family conflict (Eby et al., 2005). In addition, RNs reporting job dissatisfaction and longer experience as RNs report higher work–family conflict. Studies have shown that the less job satisfaction an employee experiences at a work place, the more likely that s/he will experience a conflict between work and family demands (Cortese et al., 2010). We are not aware of any research examining the association between lengths of experience in relation to work–family conflict.

Since work–family conflict has been shown to contribute to job dissatisfaction and RNs' intention to leave their profession (Schacklock and Brunetto, 2012) and since we have shown that organizational factors play a role in explaining work–family conflict, we believe that it is important for the future supply of RNs that hospital managements develop policies and practices which facilitate the successful combination of work with private life for employees. Potential measures could be to enhance career development opportunities, or the possibilities for RNs to participate in policy decisions, as we found that both having adequate numbers of staff and the scope for RNs to impact on hospital affairs was associated with decreased work–family conflict. Finally, policies and practices which promote a better balance between work and private life are also likely to be beneficial in other respects, such as promoting a better and more collaborative atmosphere between colleagues, which can have positive effects on the health and productivity of the workforce beyond that mediated by decreased work–family conflict.

Future research should aim to study the influence of the full range of organizational factors, from hospital through ward and work group, while taking factors in private life, e.g. family composition and unpaid work into consideration. Contractual factors such as total working hours and shift schedules should also be studied in relation to work–family conflict.

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