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Nurses' practice environment and satisfaction with schedule flexibility is related to intention to leave due to dissatisfaction: A multi-country, multilevel study

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ABSTRACT

Background: Nursing turnover is a major issue for health care managers, notably during the global nursing workforce shortage. Despite the often hierarchical structure of the data used in nursing studies, few studies have investigated the impact of the work environment on intention to leave using multilevel techniques. Also, differences between intentions to leave the current workplace or to leave the profession entirely have rarely been studied.
Objective: The aim of the current study was to investigate how aspects of the nurse practice environment and satisfaction with work schedule flexibility measured at different organisational levels influenced the intention to leave the profession or the workplace due to dissatisfaction.
Design: Multilevel models were fitted using survey data from the RN4CAST project, which has a multi-country, multilevel, cross-sectional design. The data analysed here are based on a sample of 23,076 registered nurses from 2020 units in 384 hospitals in 10 European countries (overall response rate: 59.4%). Four levels were available for analyses: country, hospital, unit, and individual registered nurse. Practice environment and satisfaction with schedule flexibility were aggregated and studied at the unit level. Gender, experience as registered nurse, full vs. part-time work, as well as individual deviance from unit mean in practice environment and satisfaction with work schedule flexibility, were included at the individual level. Both intention to leave the profession and the hospital due to dissatisfaction were studied.
Results: Regarding intention to leave current workplace, there is variability at both country (6.9%) and unit (6.9%) level. However, for intention to leave the profession we found less variability at the country (4.6%) and unit level (3.9%). Intention to leave the workplace was strongly related to unit level variables. Additionally, individual characteristics and deviance from unit mean regarding practice environment and satisfaction with schedule flexibility were related to both outcomes. Major limitations of the study are its cross-sectional design and the fact that only turnover intention due to dissatisfaction was studied.

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Conclusions: We conclude that measures aiming to improve the practice environment and schedule flexibility would be a promising approach towards increased retention of registered nurses in both their current workplaces and the nursing profession as a whole and thus a way to counteract the nursing shortage across European countries.
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What is already known about the topic?

- Both individual, health factors and organisational factors, e.g. leadership, have been shown to be important in RNs' decisions to leave the profession.
- Although multilevel studies are scarce, there is some evidence that the quality of the interactions at the group level have a significant impact on both RNs' attitudes and intentions to leave.

What this paper adds

- Intention to leave the nursing profession was mainly explained by factors at the individual level, whereas intention to leave the workplace was also explained by organisational factors.
- Practice environment and satisfaction with schedule flexibility are strongly related to RNs' intention to leave the nursing profession or the hospital workplace due to dissatisfaction.

1. Introduction

The present shortage of registered nurses (RNs) reported across EU countries is expected to worsen in the coming years due to the ageing of the nursing workforce in conjunction with increased health care needs and demands of an ageing population, but also due to loss of practicing RNs from ill-health (Duffield et al., 2015) and job dissatisfaction (Collins et al., 2000). One important measure to uphold the current level of nursing staff and to counteract further shortages is to keep nursing staff healthy and willing to continue to work. A crucial factor for a healthy and stable RN work force is the practice environment. Poor nurse–physician relations, insufficient resources (i.e., poor staffing), poor collegial relationships and poor leadership have all been shown to increase the risk for poor health and intention to leave among RNs (Estryn-Mehar et al., 2007; Vahey et al., 2004).

Whereas earlier studies have focused on RNs' intention to leave their current job or employer (Hayes et al., 2006), in recent years interest has grown in investigating factors influencing intention to leave the profession altogether (e.g. Flinkman et al., 2008; Heinen et al., 2013). Research suggests that both types of attrition are related to negative outcomes. Voluntary turnover from the hospital workplace has been related to missed care (Tschannen et al., 2010), loss of individual and organisational performance (Buchan, 2010), and increased organisational costs (O'Brien-Pallas et al., 2006). Leaving the profession might be considered detrimental for society as it generates a permanent loss of resources and may worsen nurse shortages in the long term (Buchan and Aiken, 2008). Nurses leaving the profession not only reduces the total number of nurses, but also removes their knowledge, experience, and contributions from an organisation and potentially also from the nursing workforce (Flinkman et al., 2010). Also, educating RNs generates considerable costs for both individuals and societies, which, if a RN decides to leave the profession, have been spent for no or little purpose. Thus, both types of intention to leave are important to study, but the distinction between intention to leave the profession and intention to leave the organisation/workplace has generally been neglected in research regarding nursing turnover (Simon et al., 2010).

1.1. Factors that influence leaving the profession

Both individual and organisational factors have been shown to be important in RNs' decisions to leave the profession. Burnout (Flinkman et al., 2008; Rudman et al., 2014), lack of affective personal commitment (Flinkman et al., 2008; Jourdain and Chenevert, 2010), low job satisfaction (Flinkman et al., 2008; van der Heijden et al., 2010), work-family conflicts (Flinkman et al., 2008; Lee et al., 2015), poor opportunities for development (Flinkman et al., 2008), high work demands (Flinkman et al., 2008), as well as high effort-reward imbalance and reward frustration (Li et al., 2011) have all been related to RNs' intentions to leave their profession. Also, inflexibility of shift work (Duffield and Franks, 2002) and worries about inconvenient working schedules are associated with an increased risk of leaving the profession (Duffield and Franks, 2002; Sjogren et al., 2005). Moreover, older age, male gender, and not working fulltime were shown to increase the odds for intention to leave the profession whereas favourable nurse–physician relationships, good leadership, and more positive perception of participation in hospital affairs decreased the odds for intention to leave the profession (Heinen et al., 2013).

1.2. Factors that influence leaving the hospital workplace

Factors relevant for intention to leave the profession have also been related to intention to leave the hospital workplace. Studies have repeatedly shown that a good overall practice environment is related to decreased risk of intending to leave the workplace (Aiken et al., 2012; Dekeyser Ganz and Toren, 2014; Rheaume et al., 2011). In addition, low organisational commitment (Cheng and Liou, 2011), less favourable perceptions of leadership (Lagerlund et al., 2015) and work-life imbalance (Lee et al., 2015) have

been shown to be related to intentions to leave the employer. However, in contrast to those predominantly North-American studies, one study from the eastern Caribbean did not find any association between practice environment and RNs' intentions to leave the hospital workplace (Lansiquot et al., 2012).

1.3. Studies employing a multilevel approach

The relational perspective on attitude formation argues that 'natural units of analysis for attitudes are not isolated individuals but social networks' (Erickson, 1988). Attitudes are not formed simply as a direct response to individual predispositions but through social processes that emerge under different structural conditions (Jinnett and Alexander, 1999). Thus, the positive or negative tone within a working unit affects individual attitudes and behavioural intentions. However, to date few studies have focused on this type of peer-group effect in the workplace. Also, the data used in nursing studies generally have a hierarchical or clustered structure with nurses nested in hospitals, departments and units. Multilevel models recognise the existence of such data hierarchies by allowing for residual components at each level in the hierarchy. Multilevel investigations have the potential to overcome the limitations of traditional turnover research (Griffith et al., 2000). Despite the call for more multilevel studies in organisational research (Schriesheim et al., 1999), few studies have investigated the impact of the work environment on intention to leave the nursing profession and/or the current workplace using multilevel techniques. However, there is some evidence that the quality of the interactions at the group level have a significant impact on both RNs' attitudes and intentions to leave (Portoghese et al., 2015). One study examining treatment staff in long-term mental health care settings found that group job satisfaction had an effect on intention to leave the job independently of individuals' dispositions towards their jobs (Jinnett and Alexander, 1999). Another study applying multiple multilevel models found that depersonalisation and nurse–physician relations predicted turnover intention among RNs in Belgian psychiatric hospitals (van Bogaert et al., 2013). In a study using multilevel models, Simon et al. (2010) investigated both intention to leave the profession and the organisation. It was found that intention to leave the profession was strongly associated with variables related to the personal background and the work/home interface, whereas intention to leave the organisation was related to organisational leadership and the local context. This body of empirical research highlights the importance of taking the organisational context into account when studying individuals' attitudes and behavioural intentions.

In addition to the empirical evidence, there are theoretical reasons to assume that not only individual characteristics, but also factors at higher organisational levels may influence the intention to leave. Most proximally, the individual's immediate work setting, here measured by the work practice environment, is likely to influence the individual's propensity to leave. However, this work practice environment is in turn likely to be influenced by factors at higher organisational levels, such as unit leadership, hospital finances and national policies. As Bolger et al. (1989) noted, there are also quite specific stress contagion effects which parallel the situation in which team members with a common cold increase the risk of other team members catching a cold, but not catching other diseases. This principle can be transferred to the psychosocial work practice environment such that talking about e.g. intention to leave a workplace may also increase intention to leave among the peer group. At the individual level, intentions to leave can be understood with the job-demand resources model (Bakker and Demerouti, 2007). This model makes the assumption that energy resources are depleted when job demands are too high, while job resources are insufficient. Consequently, a negative load hampering one's function will be built up and expressed by exhaustion or disengagement, the two fundamental outcome components of the model. On the other hand, when resources are sufficient to meet the job requirements, individuals will be stimulated and energy will be mobilized rather than depleted. Job demands are stated to primarily relate to exhaustion while lack of job resources is primarily related to development of disengagement (Bakker and Demerouti, 2007; Jourdain and Chenevert, 2010; Lee and Ashforth, 1996). Several studies have shown that the development of burnout, especially disengagement, plays an important role in RNs' intention to leave (Jourdain and Chenevert, 2010; Rudman et al., 2014). Examples of resources are pay, career opportunities, job security, management support, satisfactory collaboration, role clarity, and degree of autonomy in decision making, diversity of skills and perceived importance of tasks (Bakker and Demerouti, 2007). Thus, good practice environment and schedule flexibility can be considered to be resources. Also working in a unit with personnel who are predominately dissatisfied with the work environment will drain resources and thus provide reasons for disengagement, and finally intentions to leave. Still, intention to leave may also be influenced by personal characteristics (Price, 1995). That means that intention to leave may be determined by demographic profiles (such as gender, career experience, and work time) and thus, these variables are relevant in understanding turnover intentions.

Fig. 1 presents a simplified conceptual framework for the analyses. It illustrates the role which different organisational levels may play for the RN's intention to leave. The different levels are inter-correlated and influence each other. Thus, country level variables like work-time regulations, have influence on hospital variables, such as distribution of working hours, which in turn are of importance for unit level variables. Individual experiences are thus influenced by all those higher-order levels.

The current study aims to investigate how individual, unit, hospital and country level factors influence intention to leave the nursing profession or hospital workplace in a European context. We hypothesized that intention to leave the profession would be more closely related to factors at

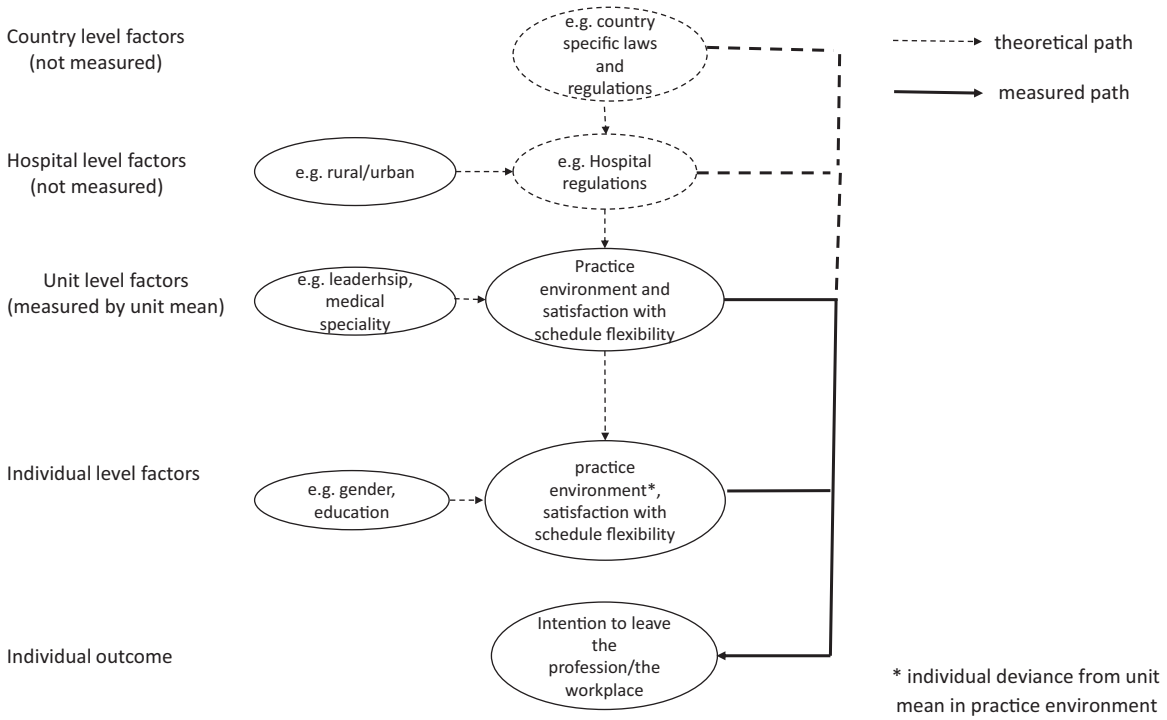

Fig. 1. Model of the relationship between individual and organisational factors.

the individual level whereas intention to leave the hospital workplace would be more closely related to factors at the organisational level.

2. Methods

2.1. Data sources

The data derives from the Registered Nurse Forecasting in Europe (RN4CAST) project, funded by the European Commission's 7th Framework Programme. Details of RN4CAST and its questionnaires are provided elsewhere (Aiken et al., 2012; Heinen et al., 2013; Sermeus et al., 2011). In summary, RN4CAST aimed to obtain a snapshot of European RNs' assessments of their hospital work environments and quality of care in order to identify promising strategies to retain RNs in their profession and to avoid erosion of quality of care resulting from cost containment. The study has a multi-country, multilevel, cross-sectional design with RNs nested within units, units nested within hospitals and hospitals nested within countries. Data were gathered between January 2009 and June 2010. The relevant data for the current analyses include four levels of analyses: RN, unit, hospital, and country.

2.2. Study sample

The participating European countries in RN4CAST are Belgium, England, Finland, Germany, Greece, Ireland, the Netherlands, Norway, Poland, Spain, Sweden and Switzerland. In most countries, the selected hospitals either represented all general acute hospitals in the country (with at least 100 beds and that either had mixed age clienteles or treated adults only) or were random samples of all general hospitals (Aiken et al., 2012). Sweden, which used a different sampling strategy, was excluded from our analyses since identification of the current working unit was impossible. Greece was excluded due to too few respondents and participating hospitals (284 respondents in 18 hospitals with a minimum of 1 and a maximum of 29 respondents/hospital). Table 1 shows the number of hospitals, units and RNs and percentages reporting intention to leave profession/current workplace for each of the ten RN4CAST countries for which appropriate data was available.

2.2.1. RN-level and unit-level variables

The RN characteristics included were gender, full vs. part-time work and years of experience as RN. Practice environment was measured by the Practice Environment Scale of the Nursing Work Index – Revised (PES-NWI-R), which is a validated and commonly used tool for investigating the nurse practice environment (Aiken et al., 2012). Responses were given on a 4-point scale ranging from 'strongly disagree' to 'strongly agree'. We used all five sub-scales of the PES-NWI-R, including (1) 'Staff and resources adequacy', which measures nurses' evaluations of the adequacy of resources to meet demands (four questions, score range: 4–16, Cronbach's $\alpha = 0.75$), (2)

Table 1
Distribution of hospitals, units and RNs and percentage distribution of outcomes – intention to leave the nursing profession and intention to leave the hospital workplace classified by country.

Country	Hospitals	Units	Units per hospital		RNs	RNs per unit		RNs intending to leave the profession % (*n*)	RNs intending to leave the workplace (conditional on remaining in the profession) % (*n*)
			Min.	Max.		Min.	Max.		
Belgium	66	269	1	6	3151	1	26	8.2 (259)	23.2 (665)
England	46	413	2	10	2918	1	22	10.3 (302)	37.6 (977)
Finland	32	126	2	6	1115	2	80	18.3 (204)	47.8 (426)
Germany	49	199	1	6	1503	1	24	16.8 (253)	23.2 (288)
Ireland	30	112	2	6	1380	1	80	11.0 (152)	37.7 (453)
Netherlands	28	131	1	8	2217	5	80	5.4 (120)	15.3 (318)
Norway	35	238	2	16	3752	3	80	10.0 (375)	18.3 (613)
Poland	30	119	2	7	2605	9	80	8.5 (222)	39.1 (847)
Spain	33	281	2	21	2804	1	80	7.6 (214)	24.0 (614)
Switzerland	35	132	2	7	1631	3	29	6.0 (98)	22.9 (349)
All countries	384	2020	1	21	23,076	1	80	9.5 (2199)	27.1 (5550)

Note: Figures in parentheses are the numbers of RNs in the categories of respective outcomes.

'Nurse impact on hospital affairs' (eight questions, score range: 8–32, Cronbach's $\alpha = 0.78$), (3) 'Nursing care model' (nine questions, score range: 9–36, Cronbach's $\alpha = 0.75$), (4) 'Leadership & Support for RNs', assessing key elements of leadership (four questions, score range: 4–16, Cronbach's $\alpha = 0.73$), and (5) 'Nurse–physician relationship', assessing the quality of working relations between doctors and nurses in the hospital (seven questions, score range: 7–28, Cronbach's $\alpha = 0.89$). To facilitate the comparison of means, all practice environment sub-scales were re-calculated into a scale ranging from 0 to 100, with lower values indicating a less favourable practice environment.

Satisfaction with schedule flexibility was measured by the question "How satisfied are you with the following aspects of your job?" followed by different job aspects, including 'work schedule flexibility'. For analyses satisfaction with work schedule flexibility was dichotomised into "satisfied" ("very satisfied" and "moderately satisfied") or "dissatisfied" ("very dissatisfied" and "a little dissatisfied").

To investigate how practice environment and schedule flexibility perceived by the RNs working within a unit influence the individual RN's intentions to leave the nursing profession/current workplace, we aggregated the ratings on the five practice environment sub-scales as well as schedule flexibility at the unit level, and entered each individual RN's deviance from the unit mean as additional individual level variables (Hofmann and Gavin, 1998; Paccagnella, 2006). (For further information on the aggregation of sub-scales at the unit level see our earlier publication (Leineweber et al., 2014).) To create the unit level variable measuring satisfaction with work schedule flexibility we calculated proportions of RNs satisfied with work schedule flexibility within each nursing unit. These explanatory variables were included at both individual (at deviance from unit mean) and unit level because it is reasonable to assume that there is individual variation in both the actual exposures and the perception of these exposures, as well as some underlying common exposure within the units.

2.2.2. Outcome variables: intention to leave profession and/or hospital workplace

Intention to leave the hospital was measured by the question: 'If possible, would you leave your current hospital within the next year as a result of job dissatisfaction'. This question was followed by a question to distinguish intention to leave the workplace from intention to leave the profession: 'If yes, what type of work would you seek?', with the response options 'Nursing in another hospital', 'Nursing, but not in a hospital', and 'Non-nursing'. Those who responded 'Non-nursing' were considered as intending to leave the nursing profession; those who answered either 'Nursing in another hospital' or 'Nursing, but not in a hospital' were recorded as intending to stay in the nursing profession.

In a second step, among those who indicated that they intended to stay in the nursing profession, we differentiated those who indicated that they want to leave the current workplace from those who intended to stay. Thus, we studied turnover intentions from the workplace only among those who did not intend to leave the nursing profession due to dissatisfaction.

2.2.3. Statistical analysis

Multilevel modelling has become a tool in health service research to explain various sources of variation at different organisational levels (Li et al., 2013; Zaslavsky, 2007). A four-level logistic random intercept model using logit link with RNs (level 1) nested within units (level 2) nested within hospitals (level 3) within countries (level 4) was applied to explore the variability explained by individual and unit level variables, taking the correlated structure of data into account (Goldstein, 1995).

The intra-class correlation coefficients (ICCs), "ρ", were used to estimate the amount of variance attributable to differences between countries, differences between hospitals within countries, and differences between units

within hospitals, on the probability of intending to leave the nursing profession/hospital workplace as a proportion of the total variance respectively as follows:

$$\rho_c = \frac{\sigma_c^2}{\sigma_c^2 + \sigma_h^2 + \sigma_u^2 + \sigma_n^2}, \quad \rho_h = \frac{\sigma_h^2}{\sigma_c^2 + \sigma_h^2 + \sigma_u^2 + \sigma_n^2}, \quad \rho_u = \frac{\sigma_u^2}{\sigma_c^2 + \sigma_h^2 + \sigma_u^2 + \sigma_n^2}$$

where $\sigma_c^2, \sigma_u^2, \sigma_h^2, \sigma_n^2$ respectively represent variation in intention to leave the nursing profession/hospital workplace at country, hospital, unit, and RN levels (Goldstein, 2003).

We specified three separate models: adjusted for individual-level variables (i.e., gender, years of experience as RN, full-time work) only (Model I), additionally adjusted for practice environment at both individual and unit level (Model II), and a model additionally including schedule flexibility at both RN and unit level (Model III). Odds ratios (ORs) were calculated from the fitted models. Competing models were compared by likelihood ratio tests in the form of deviance; the smaller the value the better the model. All models were fitted using the *lme4* package (Bates and Sarkar, 2007) and descriptive statistics along with the internal consistency of scales (Cronbach's alpha) were computed in *R* (R Development Core Team, 2014).

3. Results

3.1. Descriptive statistics

In our sample of 23,076 RNs from ten countries, 9.5% of RNs reported intention to leave the nursing profession due to dissatisfaction. Among those who did not intend to leave the profession, 27.1% reported an intention to leave their current workplace due to dissatisfaction. Table 1 shows that considerable differences in the proportion of RNs who intend to leave the nursing profession/current workplace are found among countries.

Table 2 provides descriptive statistics for the five dimensions of PES-NWI-R scales and satisfaction with schedule flexibility at the unit level. Mean staffing levels and resource adequacy in Switzerland, Finland, the Netherlands, and Norway were above the overall mean (mean = 39.7; sd = 13.6). The other countries were below the overall level with the lowest level reported in Poland (mean = 28.4; sd = 10.0). Polish RNs also reported the least favourable values for leadership (mean = 50.0; sd = 12.50) and the nurse–physician relationship (mean = 42.1; sd = 10.1). Spanish RNs reported low values in regard to 'nursing impact' (mean = 33.4; sd = 9.7), 'nursing model' (mean = 53.1; sd = 8.7) and the nurse–physician relationship (mean = 47.3; sd = 10.8). The mean proportions of RNs who reported satisfaction with their schedule flexibility were relatively high in all countries with the highest proportion in the Netherlands (87.2%) and lowest in Spain (50.2%).

Table S1 (web appendix) describes some demographic characteristics of the RNs along with the mean levels of PES-NWI-R at the level of the individual RN. The mean age ranged from 34 years in Ireland to 42 years in Finland. Whereas nearly no male RNs are found in Poland, around 10% of RNs in Germany and Spain are male. In Poland and Finland, over 90% of the RNs work full-time, while the lowest number of RNs working full-time is reported in the Netherlands (42.9%). There are also considerable differences in the proportion of RNs with education at bachelor's level or above, from 0.1% in Germany to 100% in Spain and Norway. RNs reported in average 12 or more years of working experience as an RN, with the exception of Norway, with an average of approximately 9 years.

Supplementary Table S1 related to this article can be found, in the online version, at http://dx.doi.org/10.1016/j.ijnurstu.2016.02.003.

3.2. Multilevel modelling for intention to leave the nursing profession and/or hospital workplace

Table 3 summarizes the variability in intention to leave the nursing profession/current workplace at country,

Table 2
Descriptive statistics for the five dimensions of the Practice Environment Scale (PES-NWI) and satisfaction with schedule flexibility aggregated at the unit-level by country.

Country	Mean (sd)					Satisfaction with schedule flexibility[a]
	Staffing [range: 0–100]	Nursing impact [range: 0–100]	Nursing model [range: 0–100]	Leadership [range: 0–100]	Relationship [range: 0–100]	
Belgium	37.5 (10.4)	43.3 (7.6)	58.7 (6.8)	53.5 (11.2)	52.7 (9.8)	74.8 (19.7)
England	37.3 (14.0)	48.8 (10.2)	65.7 (8.9)	59.0 (12.5)	63.0 (8.4)	75.4 (19.1)
Finland	42.5 (10.6)	41.2 (7.6)	57.6 (8.2)	56.1 (12.7)	63.6 (9.1)	81.5 (15.9)
Germany	34.0 (11.3)	55.0 (9.0)	63.5 (9.3)	52.6 (12.1)	54.8 (12.3)	83.5 (17.8)
Ireland	34.5 (12.3)	44.4 (10.8)	62.8 (9.4)	56.6 (12.8)	55.3 (8.8)	78.5 (15.2)
Netherlands	46.6 (9.7)	46.5 (5.8)	58.8 (5.3)	59.8 (8.7)	59.9 (6.4)	87.2 (14.0)
Norway	48.2 (11.7)	43.4 (8.7)	53.1 (8.7)	63.2 (10.6)	67.1 (8.1)	75.5 (17.5)
Poland	28.4 (10.0)	41.6 (11.0)	57.2 (10.6)	50.0 (12.5)	42.1 (10.1)	72.3 (13.4)
Spain	36.4 (12.5)	33.4 (9.7)	53.1 (9.8)	53.8 (15.3)	47.3 (10.8)	50.2 (19.8)
Switzerland	50.5 (14.3)	54.9 (9.9)	71.5 (10.0)	69.1 (13.1)	64.2 (9.5)	79.1 (19.1)
All countries	39.7 (13.6)	44.5 (10.9)	59.2 (10.3)	57.4 (13.2)	56.8 (12.4)	74.3 (20.2)

[a] Average percentages.

Table 3
Percentage of total variance of the intentions to leave nursing profession and hospital workplace at country, hospital, unit and individual level from the four-level logistic empty models.

Levels	Outcomes	
	Intention to leave nursing profession	Intention to eave the hospital workplace
Country	4.6	6.9
Hospital	4.1	4.3
Unit	3.9	6.9
Registered nurse	87.4	81.9

hospital, working unit and RN level as a percentage of the total variance based on the intra-class correlation. Most variability was found at the individual level, more so for intention to leave the nursing profession than for intention to leave the workplace. In addition, for intention to leave the current workplace, a significant amount of variability existed at both country (6.9%) and unit (6.9%) level. For intention to leave the profession we found less variability at the country (4.6%) and unit level (3.9%). In order to visualize the unobserved variability in intention to leave the nursing profession/hospital workplace, we have plotted the random-effects distribution at the country level from the four-level random intercept empty models along with 95% confidence intervals (CIs) separately (Fig. S1, web appendix). Finland and Germany show above average proportions of RNs reporting an intention to leave the nursing profession, whereas the Netherlands and Switzerland are considerably below average. Concerning intention to leave the current workplace, reports from Finland, the UK, Poland, and Ireland are above the average level, whereas those from the Netherlands and Norway are below average. Belgium, Spain and Switzerland are all close to the average level.

Supplementary Fig. S1 related to this article can be found, in the online version, at http://dx.doi.org/10.1016/j.ijnurstu.2016.02.003.

The associations between intentions to leave the nursing profession and the hospital workplace and the PES-NWI-R sub-scales are presented in Tables 4a and 4b, respectively. The association between the PES-NWI-R scales and intentions to leave the nursing profession and the workplace did not differ considerably between Model II (controlling for the practice environment scales and demographics) and Model III (additionally controlled for scheduled flexibility). However, we use Model III for consistent presentation of results, as it shows better model fit (difference in deviance statistics was highly significant with $p < 0.001$) for both the intention to leave the nursing profession and the intention to leave the hospital workplace.

When aggregated at the unit level, three of the five PES-NWI-R variables were significantly related to the intention to leave the profession (Table 4a). Higher scores on staffing and resources (OR = 0.984; 95% CI: 0.977–0.989), nursing impact on hospital affairs (OR = 0.988; 95% CI: 0.980–0.995), and nurse–physician relationship (OR = 0.994; 95% CI: 0.988–0.999) all significantly decreased the odds of leaving the nursing profession due to dissatisfaction. We

Table 4a
Four-level random intercept models of intention to leave nursing profession ($N = 23,076$).

	Model-I	Model-II	Model-III
	Odds ratio [p-value]	Odds ratio [p-value]	Odds ratio [p-value]
RN level			
RNs' characteristics			
Male	1.494*** [<0.001]	1.493*** [<0.001]	1.465*** [<0.001]
Career experience as RN	1.020*** [<0.001]	1.019*** [<0.001]	1.020*** [<0.001]
Full-time working	0.833* [0.011]	0.865* [0.011]	0.859* [0.014]
Practice Environment Scale[a]			
Staffing and resources	–	0.983*** [<0.001]	0.985*** [<0.001]
Nursing impact	–	0.980*** [<0.001]	0.981*** [<0.001]
Nursing model	–	0.999 [0.868]	0.999 [0.831]
Leadership	–	0.983*** [<0.001]	0.986*** [<0.001]
Nurse–physician relationship	–	0.988*** [<0.001]	0.988*** [<0.001]
Satisfaction with schedule flexibility[a,b]	–	–	0.603*** [<0.001]
Unit level			
Aggregated Practice Environment Scale at unit level			
Staffing and resources	–	0.982*** [<0.001]	0.984*** [<0.001]
Nursing impact	–	0.987** [0.001]	0.988*** [<0.001]
Nursing model	–	1.005 [0.258]	1.004 [0.168]
Leadership	–	0.997 [0.883]	0.999 [0.354]
Nurse–physician relationship	–	0.994* [0.037]	0.994* [0.045]
Satisfaction with schedule flexibility[b]	–	–	0.557*** [<0.001]
Deviance of model fit	13,072.40	12,456.40	12,250.50

[a] Deviation from unit-level mean score.
[b] Proportion of RNs satisfied with schedule flexibility in each unit.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

Table 4b
Four-level random intercept models of intention to leave hospital workplace among those not intending to leave the profession ($N = 20,877$).

	Model-I Odds ratio [*p*-value]	Model-II Odds ratio [*p*-value]	Model-III Odds ratio [*p*-value]
RN level			
RNs' characteristics			
Male	1.141 [0.060]	1.132 [0.064]	1.153 [0.057]
Career experience as RN	0.982*** [<0.001]	0.979*** [<0.001]	0.979*** [<0.001]
Full-time working	1.168*** [<0.001]	1.258*** [<0.001]	1.223*** [<0.001]
Practice Environment Scale[a]			
Staffing and resources	–	0.983*** [<0.001]	0.985*** [<0.001]
Nursing impact	–	0.978*** [<0.001]	0.980*** [<0.001]
Nursing model	–	0.994 [0.169]	0.996* [0.026]
Leadership	–	0.969*** [<0.001]	0.972*** [<0.001]
Nurse–physician relationship	–	0.989*** [<0.001]	0.991*** [<0.001]
Satisfaction with schedule flexibility[a,b]	–	–	0.463*** [<0.001]
Unit level			
Aggregated Practice Environment Scale at unit level			
Staffing and resources	–	0.973*** [<0.001]	0.976*** [<0.001]
Nursing impact	–	0.993* [0.035]	0.993* [0.027]
Nursing model	–	0.993* [0.039]	0.994* [0.027]
Leadership	–	0.984*** [<0.001]	0.988*** [<0.001]
Nurse–physician relationship	–	0.994** [0.008]	0.993* [0.018]
Satisfaction with schedule flexibility[b]	–	–	0.288*** [<0.001]
Deviance of model fit	20,516.60	18,563.10	18,108.80

[a] Deviation from unit-level mean score.
[b] Proportion of RNs satisfied with schedule flexibility in each unit.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

can also see that the higher the proportion of RNs who are satisfied with schedule flexibility within a unit, the lower the odds of intending to leave the nursing profession at unit levels. There is a 44% decrease in the odds of intending to leave the nursing professing with a one point increase in proportion of RNs who are satisfied with their schedule flexibility.

At the individual level, we found that the individual deviance from unit mean for all PES-NWI-R variables, except the nursing model, were significantly associated with intention to leave the nursing profession. For example, a positive individual deviance from the unit mean in the rating of staff and resource adequacy was associated with 7% lower odds of intention to leave the nursing profession (OR = 0.93; 95% CI = 0.90–0.95). Similarly, a positive individual deviance from the unit mean in the rating of nursing impact on hospital affairs, good leadership and positive nurse–physician relationships significantly decreased the odds of reporting an intention to leave the profession. Thus, overall, the individual experience of the practice environment has a significant impact on intention to leave the nursing profession. There was also a 40% decrease in the odds of intending to leave the nursing profession for a one unit increase in proportion of RNs who were more satisfied with the schedule flexibility than their colleagues in the unit.

Furthermore, we found highly significant associations between gender and career experience as an RN on the one hand, and intention to leave the nursing profession on the other. Being male and having more years of experience as RN increased the odds of intending to leave the nursing profession ($OR_{male} = 1.47$; 95% CI = 1.23–1.74; $OR_{experience\ per\ additional\ year} = 1.02$; 95% CI = 1.01–1.03), whereas working full-time decreased the odds.

Results for intention to leave the current workplace are presented in Table 4b. When examining data aggregated at the unit level, we found that all PES-NWI-R variables had a significant impact on the risk of intending to leave the current workplace. Increased staff and resource adequacy is associated with a 2% decrease in the odds of intending to leave the current workplace (OR = 0.976; 95% CI = 0.972–0.981). Also improved leadership and support for RNs significantly decreased intention to leave the current workplace (OR = 0.988; 95% CI = 0.983–0.993), i.e., support from leadership for the RNs at the unit level decreased the individual RNs' intention to leave the current workplace by 1%. Also, as for intention to leave the nursing profession, we found a significant negative association between satisfaction with schedule flexibility and intention to leave the hospital workplace.

At the individual RN level, we found that individual deviance from unit mean for all PES-NWI-R variables was significantly associated with intention to leave the workplace. The more the individual assessment of the practice environment positively deviated from unit mean, the less likely the RN intended to leave the workplace due to dissatisfaction. Also, RNs satisfied with schedule flexibility who worked in units with many colleagues dissatisfied with schedule flexibility had decreased odds of intending to leave the work place. At the individual level we found that among RNs who did not intend to leave the profession due to dissatisfaction, the intention to leave the

hospital workplace decreased with increasing years of experience. RNs working full-time were more likely to report an intention to leave the current workplace.

4. Discussion

This study aimed to understand the impact of the practice environment and satisfaction with schedule flexibility on RNs' intention to leave the profession or workplace due to dissatisfaction, within a multi-country multi-level context. Thus, we could differentiate variables which operate at higher organisational levels from those operating on a lower level, i.e. those only driven by individual differences. Considerable differences in the percentage of RNs who intend to leave their profession or the hospital workplace were found between the ten investigated countries. Even estimates on practice environment dimensions and satisfaction with schedule flexibility differed considerably.

As expected, intention to leave the nursing profession was primarily explained by factors at the individual level, including personal background, whereas for intention to leave the workplace organisational factors, i.e., work environment and satisfaction with work schedule flexibility, can also be regarded as significant explanatory factors. This seems reasonable as the intention to leave the profession may be related to general feelings, i.e. dissatisfaction with the work tasks, health problems or incongruence between work and private needs, whereas intention to leave the specific work place is related more to concrete features within the organisation. Our findings concur with earlier findings from Simon et al. (2010) which showed that intention to leave the profession was strongly associated with variables related to the personal background and the work/home interface, whereas intention to leave the organisation was related to organisational leadership and the local context.

Male gender was the individual RN variable most strongly related to increased intentions to leave the profession, but no relationship between gender and intention to leave the workplace was found. This is in line with finding reported by Estryn-Behar et al. (2010) found that male gender was related to stronger intentions to leave the profession. Longer work experience as a RN was positively related to intention to leave the profession, but negatively related to intention to leave the work place. Thus, with increasing work experience RNs intended more often to leave the profession, but among those who did not intend to leave the profession, the intention to leave the workplace decreased with increasing work experience. Our findings are supported by earlier studies which demonstrated that turnover intention from the current workplace is negatively correlated with years of nursing experience (Hayes et al., 2012). One possible explanation is that with increasing work experience either the RN has found the workplace where she is comfortable or she recognises (possible after having worked at several work places) that nursing is not a profession satisfying her. In regard to working time, we found that RNs working full-time were less likely to report intending to leave the profession, but were more likely to want to leave their workplace. These findings correspond to those reported by Cortese (2012), who found that working part-time was associated with a greater intention to leave the profession. Findings reported from a Canadian study, however, showed that RNs in part-time employment are less likely to intend to leave their profession compared to RNs in full-time employment (Zeytinoglu et al., 2011). A possible explanation for our finding could be that RNs working full-time are more exposed to the practice environment. Thus, dissatisfaction with the workplace might be a stronger motivational factor for RNs working full-time in comparison to those working part-time. Further, part-time work could be a first step to leave the profession, which would explain the higher association with intention to leave the profession.

As mentioned above, individual deviance from unit mean in reported experience of the practice environment was strongly related to intentions to leave the workplace but also to intentions to leave the nursing profession. RNs who assessed their practice environment more positively than the unit in average had a decreased odds of intending to leave the profession/workplace. However, one of the main findings reported here is that the practice environment measured at the unit level was also shown to play a major role in RNs' intentions to leave the current workplace and, to a lesser degree, the nursing profession. Thus, the RNs' intentions to leave were influenced by how the practice environment was experienced at the unit level, independently from one's own experience. In line with results reported by Jinnett and Alexander (1999), our results indicated that the affective context of the unit may be more important in terms of staff retention than the organisation of tasks at the individual level. Furthermore, our results indicate that subjective experience of adequate staffing and resources in particular are essential to keep RNs in the workplace/profession, factors which have also been shown to be of importance for RNs' perception of being able to provide quality nursing care (Smeds Alenius et al., 2014).

Shift schedule flexibility is one work feature which may be of particular importance in health care professions that are often required to work shifts. On the one hand, the possibility of influencing the shift schedule provides the RN with the possibility of adjusting their working hours in line with their individual needs in their personal life and for recovery. In addition, merely having the possibility of being able to influence the shift schedule could reduce feelings of stress (Garde et al., 2012) and thus reduce intentions to leave the profession/workplace. Indeed, we found that RNs who were more satisfied with schedule flexibility than their unit colleagues were less likely to intend to leave the nursing profession or the current workplace. The results are also supported by findings reported by Flinkman et al. (2008) who found that unsatisfactory work schedules as well as conflict between work and family commitments influenced the intention to leave the profession among a sample of young Finnish RNs. Also findings by Oginska et al. (2003) showed that the discrepancy between the individual's shift schedule preferences and the actual work schedule affected RNs' intentions to leave the nursing profession. Interestingly,

individual RNs' intentions to leave the profession/workplace were influenced not only by individually experienced satisfaction with schedule flexibility, but also by unit level satisfaction with schedule flexibility. Thus, we see that there tends to be agreement within units in how satisfied RNs are with schedule flexibility and that this common perception is related to intention to leave. However, satisfying RNs wishes for schedule flexibility may conflict with staffing and patients' needs, as an adequate and relevant RN skill-mix might be impaired by individual desire to influence scheduling (Griffiths et al., 2014).

Although our study contributes towards understanding how organisational level factors influence RNs intentions to leave the nursing profession or their current workplace, there are also limitations to consider. Firstly, in our questionnaire, intention to leave refers explicitly to intention to leave due to job dissatisfaction which can create rather trivial correlations and makes it difficult to know to what extent the findings can be generalised to overall intention to leave. There might be a number of RNs who consider leaving the nursing profession or the current hospital workplace for other reasons, e.g., health, personal circumstances or other work-related factors, e.g., heavy physical work load or psychosocial stress (Burnay, 2008). It is unclear how RNs who consider leaving because of reasons other than job dissatisfaction answered the questions regarding intention to leave. Still, along with work stress, dissatisfaction has been highlighted as a main contributing factor to turnover (Coomber and Barriball, 2007). Another consideration when interpreting the results of the study is the cross-sectional design. It is possible that RNs who intend to leave their profession/current workplace evaluate their work environment and shift schedule flexibility as worse than RNs who intend to stay. Thus, no conclusions about causality or the direction of the associations can be drawn. Thirdly, in regard to satisfaction with schedule flexibility, we only know if a RN is (dis)satisfied with the schedule flexibility, but not whether schedule flexibility is perceived as too high or too low. If the flexibility is used mainly to serve the needs of the hospital, high flexibility may not serve RNs' needs. In contrast, if schedule flexibility aims at allowing RNs to exert greater influence over their working hours, it might be seen as positive from RNs' point of view. Lastly, there may be other, here unobserved, variables influencing RNs' intentions to leave. Intentions to leave the nursing profession in particular might be related to individuals' personal background and work-life balance (Simon et al., 2010).

4.1. Implications for practice and conclusion

To keep RNs in their profession and at their workplace is not only of importance for the individuals' well-being and career development, but is essential for future possibilities to provide adequate quality and quantity of health care. Drainage of experienced RNs from the occupation and workplace is related to several risks, i.e. the risk for poor care (Tschannen et al., 2010), less satisfied patients (Aiken et al., 2012), and lower nursing levels are known to be related to increased mortality (Aiken et al., 2014). Our findings suggest that measures aiming at an improved practice environment for RNs could be a promising approach for increased retention of RNs at both their current workplace and in the nursing profession in general, and thus a way to counteract the nursing shortage across European countries (West et al., 2007). Adequate resources to meet demands, nursing impact on hospital affairs, good leadership and good working relations between doctors and nurses are key elements to sustain and ensure high quality care. The results also highlight the importance of taking not only individual factors but also the group context into account. The nursing units' experience of the nurse practice environment is at least of equal importance as individual experience.

Based on this study of 23,076 RNs working in 2020 units in 384 European hospitals, we conclude that the practice environment and satisfaction with schedule flexibility are strongly related to RNs' intention to leave the nursing profession or the hospital workplace due to dissatisfaction. In addition to RNs' individual perceptions, organisational (i.e., unit level) aspects played a major role in explaining RNs' intentions to leave their current workplaces, while intentions to leave the nursing profession seemed to be more closely related to personal background and factors outside the workplace as well as with the practice environment and degree of satisfaction with schedule flexibility.

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