



Job demands, burnout, and engagement among nurses: A multi-level analysis of ORCAB data investigating the moderating effect of teamwork



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ABSTRACT

According to the Job Demands-Resources (JD-R) model, burnout and engagement are psychological reactions that develop when individual characteristics interact with work characteristics. This study tests the JD-R model using multilevel analysis to test the main and moderating effects of teamwork effectiveness among 1156 nurses in 93 departments from seven European countries. Workload, emotional and organizational demands were positively associated with emotional exhaustion, depersonalization, and negatively with vigor. Emotional and organizational demands were negatively associated with dedication. Teamwork effectiveness was positively associated with engagement. We found no evidence for the moderating effect of teamwork effectiveness in reducing individual perceptions of demands.

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1. Introduction

Hospitals are inherently stressful organizations (Montgomery, Panagopoulou, Kehoe, & Valkanos, 2011). Health professionals make critical decisions under time pressure, help patients who sometimes are in life threatening conditions and face emotionally demanding interactions. For nurses in particular (compared to physicians), working in hospitals is even more demanding as they have less work autonomy, less career development opportunities, and less alternatives for career change (Aiken et al., 2013; Janssen, De Jonge, & Bakker, 1999). The current economic crisis and the pressure to balance budgets with less financial resources add extra burden on the nursing personnel due to the understaffing and the resulting workload. At the same time, the use of new technology in medical care brings new challenges in terms of acquiring new knowledge and mastering new skills. The nursing profession is among the most exposed to work strain with negative consequences for their physiological health and psychological well-being (Aiken et al., 2013; Janssen et al., 1999). The most optimistic numbers show that at least one in three nurses experience job burnout (de Moreira, 2009; Poncet et al., 2007). These estimates can reach as high as 50% (Imai, Nakao, Tsuchiya, Kuroda, & Katoh, 2004) or even 80% in some medical specialties (Hooper, Craig, Janvrin, Wetsel, &

Reimels, 2010; Mealer, Burnham, Goode, Rothbaum, & Moss, 2009). The impact of job burnout and job engagement in hospitals and the nursing profession can be most appropriately understood via the Job Demands-Resources (JD-R) model, which posits that every work context can be described in terms of job demands and job resources. The present study will examine the influence of a shared job resource (i.e., teamwork effectiveness) in medical departments.

In terms of the JD-R model, we expect that teamwork effectiveness represents a significant resource that will be associated with higher levels of job engagement and lower levels of job burnout. Moreover, it is expected that it will moderate the relationship between job demands and burnout. It is unlikely that demands for nurses can be modified/reduced given that their workflow is relatively stable and bringing in extra staff is only an option during unusual circumstances. Feeling that work is shared should reduce feelings of exhaustion and depersonalization. The JD-R model puts emphasis on the motivational aspect of work, which is particularly relevant for front-line healthcare workers. The fact that teamwork is a shared resource obligates one to look at these effects at both the individual and unit-level via a multi-level approach.

1.1. Job burnout and work engagement among healthcare professionals

Job stressors for the nursing profession will continue to multiply and diversify in the future, due to a combination of expectations

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of better quality of care and ever decreasing resources. It is thus important to identify individual, interpersonal and organizational characteristics that can protect nurses when facing job stressors and can help them perform at their highest potential (de Jonge, Mulder, & Nijhuis, 1999). Studies investigating how job resources play a role in diminishing the influence of work stressors (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001) have focused mostly on individual level resources (e.g. Bakker, Demerouti, & Euwema, 2005; Bakker, Demerouti, & Verbeke, 2004; Hakanen, Bakker, & Schaufeli, 2006; Janssen et al., 1999; Schaufeli & Bakker, 2004) or conceptualized and measured interpersonal and organizational job resources at the individual level (e.g. Hall, Dollard, Winefield, Dormann, & Bakker, 2013; Idris, Dollard, Coward, & Dormann, 2012) and not as a shared understanding among coworkers. Individuals rarely perform their jobs in isolation. Working within an organization often requires coordinated efforts by members of organizational units (e.g. departments, work groups, project-based teams) who share common experiences, a common work climate, and common occupational health issues (Bakker, Van Emmerik, & Euwema, 2006; González-Morales, Peiró, Rodríguez, & Bliese, 2012). They also share common resources such as the quality of teamwork (Busch, Deci, & Laackmann, 2013) or the quality of collegial relationships (Li et al., 2013). Multi-level studies of nurses have evaluated a range of issues such as intention to leave (Simon, Müller, & Hasselhorn, 2010), emotional display rules (Diefendorff, Erickson, Grandey, & Dahling, 2011) and daily tasks accomplishment (Gabriel, Diefendorff, & Erickson, 2011). However relatively few studies have investigated the role of individual and unit-level resources in influencing nurses' well-being or the cross-level influences that might exist between unit-level resources and individual perceptions of job demands. For example, Li et al. (2013) found nurse work environment dynamics were related to nurses' burnout, and Van Bogaert, Clarke, Roelant, Meulemans, and Van de Heyning (2010) found that positive shared ratings of nurse practice environment were associated with reduced burnout. In the present study, our aim was to investigate the association of teamwork effectiveness within medical departments on job demands, job burnout and work engagement among nurses.

Burnout is a psychological response to long term exposure to occupational stressors (Maslach, Leiter, & Jackson, 2012; Schaufeli, Leiter, & Maslach, 2009). When experiencing burnout, people report feeling emotionally exhausted – lacking the energy to invest in their work like they used to; they experience depersonalization – a detached, cynical attitude towards work, co-workers and clients; and they have low personal accomplishment – the feeling of failure in everything job-related. Among health professionals, burnout is associated with negative consequences like sleep deprivation (Vela-Bueno et al., 2008), medical errors (Fahrenkopf et al., 2008; Shanafelt et al., 2009), poor quality of care (Shanafelt, Bradley, Wipf, & Back, 2002; Shirom, Nirel, & Vinokur, 2006), and poor quality of life (Mealer et al., 2009). Burnout among health professionals was also associated with low ratings of patient satisfaction (Vahey, Aiken, Sloane, Clarke, & Vargas, 2004).

On the opposite side, work engagement is characterized by high levels of energy, dedication and work-driven efficacy (Schaufeli & Bakker, 2004; Schaufeli, Salanova, Gonzalez-Roma, & Bakker, 2002). People experiencing vigor report feeling energized, resilient and persistent in their work. Dedication refers to a sense of finding significance in one's job; people feel proud and inspired by their work. Absorption is feeling of profound happiness that is born when people are so deeply concentrated in their work that they lose time notion and have difficulties in pulling away from their tasks. Work engagement is an important predictor of performance in different organizational settings (Christian, Garza, & Slaughter, 2011).

Nurses' performance is critical to the delivery of quality patient care. However, the factors that best predict optimal nurse

performance are not well established. Research shows that employees' engagement with their work is an important predictor of job satisfaction and intentions to remain in the organization (Leiter & Maslach, 2004). Creating conditions that promote employee engagement has the potential to positively influence retention and improve the patient experience.

1.2. The Job Demands-Resources model

According to the Job Demands-Resources (JD-R) model (Bakker & Demerouti, 2007; Demerouti & Bakker, 2011), both job burnout and work engagement are psychological reactions that develop when individual characteristics interact with work characteristics. The model posits that every work context can be described in terms of job demands and job resources (Bakker & Demerouti, 2007; Demerouti et al., 2001). Job demands are aspects of work that require long-term physical, emotional or cognitive effort and therefore are associated with physiological and psychological costs (Demerouti & Bakker, 2011). Job demands (e.g., irregular work hours, time pressure, attending too many patients at the same time, demanding interactions with patients) are not necessarily negative, but they turn into work stressors if they require excessive effort from which one fails to recover properly. The present research is cross-sectional, however long-term exposure to job demands can thus lead to physical and psychological impairments such as burnout (Demerouti et al., 2001) or depression (Hall et al., 2013). Evidence of the positive association between job demands and burnout were found in multiple organizational settings (Bakker et al., 2004, 2005; Brough et al., 2013; Hakanen et al., 2006; Schaufeli & Bakker, 2004). In nursing personnel, job demands such as time pressure, emotionally demanding interactions and insufficient personnel were found to predict both emotional exhaustion and depersonalization (Bourbonnais, Comeau, Vézina, & Dion, 1998; Jenkins & Elliott, 2004; Sundin, Hochwalder, & Lisspers, 2011). As emotional exhaustion and depersonalization are considered the core dimensions of burnout (Demerouti et al., 2001), in this study we focused only on the two and hypothesized that:

Hypothesis 1. Job demands (i.e., workload, emotional and organizational) will positively relate to (a) emotional exhaustion and (b) depersonalization in nurses.

In addition to the role played in the development of work-related strain, job demands appear to also have a negative association with individuals' motivation to engage in work (Bakker, Van Veldhoven, & Xanthopoulou, 2010; Mauno, Kinnunen, & Ruokolainen, 2007), although empirical data supporting this relation is inconsistent. The effect appears to depend on the nature of the demands measured (Crawford, Lepine, & Rich, 2010; Garrosa, Moreno-Jiménez, Rodríguez-Muñoz, & Rodríguez-Carvajal, 2011). As different demands might have different influences in different work contexts (Demerouti & Bakker, 2011), we investigated the relation between job demands and work engagement. In the present study, job demands were operationalized as workload, organizational and emotional demands. The selection of these demands was based on exhaustive qualitative research conducted prior to the quantitative survey. This work is described in more detail in Section 2.3 of the paper. Thus, we hypothesized that:

Hypothesis 2. Job demands (i.e., workload, emotional and organizational) will negatively relate to (a) vigor and (b) dedication in nurses.

Job resources (e.g., autonomy, support from colleagues and supervisors, feedback, opportunities for training and development) are aspects of work that are instrumental in achieving work goals,

facilitate learning and growth and temper the negative effect of job demands (Hakanen et al., 2006; Schaufeli & Bakker, 2004). Job resources facilitate employees' motivation to engage in work, and reduce the level of burnout by buffering the impact of job demands (Bakker et al., 2004, 2010; Crawford et al., 2010; Schaufeli & Bakker, 2004).

Few studies investigating the JD-R model have simultaneously investigated individual and unit-level variables although some attempts to integrate multi-level constructs have been made (Demerouti & Bakker, 2011; Dollard & Bakker, 2010; González-Morales et al., 2012). Dollard and Bakker (2010) for example tested a model investigating the role of psychological safety climate in explaining job demands and resources and employees' well-being. Westman, Bakker, Roziner, and Sonnentag (2011) found that unit-level cohesion and social support exacerbate the crossover of perceived job demands and emotional exhaustion from the team to the individuals, suggesting that cohesion and social support actually facilitate burnout spread among team members. This counterintuitive finding highlights the fact that variables that are protective at the individual level may do the opposite at the team/unit level. In a longitudinal study González-Morales et al. (2012) found that a shared perception of burnout at team level is a stronger predictor of burnout at the individual level six months later, after controlling for the effect of individual level burnout, job demands and job resources. The study showed that a shared perception of a burnout climate among coworkers was more strongly associated with developing burnout symptoms than individual perceptions of demands or resources. In a different study, Busch et al. (2013) found that understaffing in teams was a significant team stressor, and that lower quality in teamwork design was associated with more psychosomatic complaints beyond job demands and resources. Among nurses, a climate of collegial relations between doctors and nurses at the unit level was found to reduce emotional exhaustion and depersonalization at the individual level (Li et al., 2013). We focused on teamwork effectiveness within medical departments as an unit-level, shared job resource among nurses and investigated its association with job burnout and engagement.

Hypothesis 3. Department-level teamwork effectiveness will negatively relate to (a) emotional exhaustion and (b) depersonalization.

Hypothesis 4. Department-level teamwork effectiveness will positively relate to (a) vigor and (b) dedication.

As already mentioned, job resources are also expected to moderate the effect of job demands on burnout (Bakker & Demerouti, 2007), we thus expected a cross-level, moderating effect of department-level teamwork effectiveness in the relation between job demands and burnout.

Hypothesis 5a. Department-level teamwork effectiveness moderates the positive relation between job demands (i.e., workload, emotional and organizational) and emotional exhaustion. Specifically, in departments that are rated higher in teamwork effectiveness, the positive relation between job demands and emotional exhaustion will be weaker.

Hypothesis 5b. Department-level teamwork effectiveness moderates the positive relation between job demands (i.e., workload, emotional and organizational) and depersonalization. Specifically, in departments that are rated higher in teamwork effectiveness, the positive relation between job demands and depersonalization will be weaker.

2. Method

2.1. Data source and ethical considerations

The data used for this study were collected as part of the ORCAB project, funded by the Seventh Framework Programme of the European Union. The project investigates the relation between organizational factors, burnout, health professionals' quality of life, and quality of care. A cross-sectional survey was conducted in hospitals from seven European countries between September 2011 and May 2012. The survey protocol was approved by the ethical committee in all hospitals in which data were collected. Our study reports only on the data collected from the nurses that participated to the survey.

2.2. Sample

The initial sample consisted of 1418 nurses from 147 distinct departments. Forty-nine participants with missing data concerning their unit were excluded. Forty departments had 3 or less participants in the sample and were also excluded from further analyses ($N=90$). It resulted in a sample of 1279 nurses in 107 departments from Bulgaria ($N=122$, 18 departments, mean age=45.75, $SD=9.95$; mean tenure within the hospital=13.25, $SD=12.51$; mean tenure within the department=11.56, $SD=12.13$), Croatia ($N=122$, 12 departments, mean age=42.56, $SD=10.76$; mean tenure within the hospital=22.02, $SD=10.95$; mean tenure within the department=17.92, $SD=11.57$), FYROM ($N=138$, 7 departments, mean age=36.96, $SD=9.20$; mean tenure within the hospital=12.56, $SD=9.70$; mean tenure within the department=9.50, $SD=8.59$), Greece ($N=263$, 22 departments, mean age=39.88, $SD=7.52$; mean tenure within the hospital=12.24, $SD=9.16$; mean tenure within the department=7.05, $SD=6.73$), Portugal ($N=165$, 11 departments, mean age=34.29, $SD=7.52$; mean tenure within the hospital=12.53, $SD=10.26$; mean tenure within the department=6.18, $SD=6.11$), Romania ($N=181$, 18 departments, mean age=39.06, $SD=8.00$; mean tenure within the hospital=12.82, $SD=9.70$; mean tenure within the department=10.61, $SD=8.07$), and Turkey ($N=288$, 19 departments, mean age=35.50, $SD=7.99$; mean tenure within the hospital=11.28, $SD=9.70$; mean tenure within the department=8.48, $SD=7.37$). The vast majority of the sample consisted of women (92.8%), with a mean age of 38.74 ($SD=9.31$), and a mean tenure within the department of 9.49 years ($SD=8.95$). The average number of nurses in each department was 11.95 ($SD=9.60$), with a minimum of 4 and a maximum of 45 nurses.

2.3. Instruments

2.3.1. Burnout

The two scales of the Maslach Burnout Inventory – Human Services Survey (Maslach, Jackson, & Leiter, 1996) assessing emotional exhaustion and depersonalization were used to measure burnout. The emotional exhaustion scale has 9 items such as “*I feel emotionally drained from my work*”. The depersonalization scale has 5 items such as “*I've become more callous toward people since I took this job*”. Items are rated on a scale from 0 (never) to 6 (always). Reliability analysis indicated an Alpha Cronbach coefficient of .909 for emotional exhaustion and .818 for depersonalization, as presented in Table 1.

2.3.2. Engagement

Two scales from the Utrecht Work Engagement Scale (UWES) (Schaufeli et al., 2002) were used to measure vigor and dedication. Vigor is measured with 6 items such as “*When I get up in the morning, I feel like going to work*”. Dedication is measured with 5 items such as

Table 1
Pearson correlations and alpha-Cronbach coefficients (N = 1279).

	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Sex	1.93	0.25	–										
2. Age	38.74	9.32	.058*	–									
3. Department tenure	9.50	8.96	.040	.594**	–								
4. Workload	3.63	0.78	.030	.002	.000	.705							
5. Organizational demands	2.41	0.83	.025	–.023	–.017	.328**	.768						
6. Emotional demands	2.56	0.70	.009	–.026	–.048	.318**	.513**	.648					
7. Teamwork	3.55	0.90	.009	.037	–.030	–.175**	–.434**	–.242**	.866				
8. Emotional exhaustion	20.85	12.68	.041	.024	–.024	.363**	.420**	.428**	–.302**	.909			
9. Depersonalization	5.42	6.10	.005	–.094**	–.089**	.248**	.390**	.423**	–.248**	.644**	.818		
10. Vigor	24.84	8.03	.001	.096**	.046	–.230**	–.352**	–.326**	.351**	–.513**	–.461**	.853	
11. Dedication	21.45	7.14	–.019	.034	.059*	–.156**	–.293**	–.258**	.311**	–.380**	–.384**	.792**	.842

Sex (1 = male, 2 = female).

Numbers in bold indicate Cronbach's alpha value.

* $p < .05$.

** $p < .01$.

"I am enthusiastic about my job". Items are assessed on a Likert scale from 0 (never) to 6 (always). Internal consistency coefficients were very good for both scales, .853 for the vigor and .842 for dedication.

2.3.3. Job demands

The Hospital Experience Scale (HES) (ORCAB, unpublished) was used to measure job demands. The instrument was specifically developed for hospitals settings as part of the ORCAB project. Prior to the present quantitative research, qualitative interviews were conducted in all target countries in hospital settings. The results of this qualitative analysis are published as a special series in the British Journal of Health Psychology (Montgomery, Todorova, Baban, & Panagopoulou, 2013). On the basis of this qualitative work and confirmatory statistical analyses, workload, organizational demands and emotional demands were selected as the most valid measures of job demands in the HES. All items were rated from 1 (never) to 5 (always). The workload scale consists of 4 items ($\alpha = .705$) such as "I have to work very fast and in a hurry". Organizational demands are measured with 4 items ($\alpha = .768$) such as "The roles in my department are not clear". The emotional demands scale consists of 5 items ($\alpha = .648$) such as "I have to deal with verbally abusive patients".

2.3.4. Teamwork effectiveness

Teamwork effectiveness within Hospital Units Scale from the Hospital Survey on Patient Safety Culture (AHRQ, 2014) was used to measure teamwork effectiveness. The scale has 4 items ($\alpha = .866$) measured on a scale from 1 (negative) to 5 (positive). Examples of items are "When a lot of work needs to be done quickly, we work together as a team to get the work done" or "In this unit, people treat each other with respect". Participants were instructed to rate teamwork effectiveness within their department.

All instruments were translated and adapted from English in the national language of the countries participating in the study.

2.4. Data analysis

Multilevel regression analysis (Hox, 1995) in HLM 7.0 was used for testing the hypotheses. These sorts of models are better suited than classical regression models for nested data as in our data set (Hox, 1995). Multilevel regression analysis allowed us to test for the main effects of both the individual-level predictors (job demands) and department-level predictors (teamwork effectiveness) on individual-level burnout as stated by Hypotheses 1–4. It also allowed us to test the cross-level interactions stated by Hypothesis 5. All additional preliminary analyses were performed in SPSS 21.0.

2.4.1. Data aggregation

Teamwork effectiveness was conceptualized and measured as a unit-level predictor. Individual ratings were aggregated at department level using the average score of the department. We used a referent-shift composition model for aggregation (Chan, 1998) as all items were worded so that the department and not the individual was the target of the evaluation. In order to ensure that there is enough evidence to justify the unit-level data aggregation, we tested for within group agreement and between group variability (Bliese, 2000). We calculated a_{wg} to test for within group consensus. Values of $a_{wg} > .70$ indicate appropriate levels of agreement (Brown & Hauenstein, 2005). We also calculated ICC(1) and ICC(2) as indicators of both within group consistency and between groups variability (Bliese, 2000). In real work units, ICC(1) is expected to range between .05 and .25 and ICC(2) is expected to be above .70 (Bliese, 2000). To estimate ICC(1) and ICC(2) we used the formula proposed by Bliese and Halverson (1998) adjusting for unequal number of raters in each group.

2.4.2. Hypotheses testing

Four separate regression models were tested, with emotional exhaustion, depersonalization, vigor and dedication as dependent variables. Job demands were entered as level one variable (individual level) and teamwork effectiveness was entered as level two variable (department level). The data analysis employed followed the guidelines provided by Hox (1995) and Garson (2013). When performing multi-level regression analysis, four nested models are tested. The first model (M0) is the null model or the intercept-only model. The null model indicates the amount of variance in the dependent variable which is explained by second level variables. This model also explores if the multi-level analysis is justified for the data set. Next, level one predictors are entered and a distinct regression line is calculated for each level two unit (M1). In the third nested model (M2), the intercept term at level one is predicted as a random effect of level two variables. In the fourth model (M3) the slopes of level one variables are also predicted as random effects of level two predictors. Each time a chi square test is used to estimate the improvement in the variance explained by the additional model specifications. If the difference in the chi square does not indicated enough evidence for improvement in the variance explained, from one nested model to the other, the testing of following models is not sustained.

3. Results

3.1. Descriptive statistics

Table 1 presents means, standard deviations, correlations and reliability coefficients for the variables used for this study. As it can

be seen in the table, the two burnout dimensions are highly correlated, as well as the two engagement dimensions. The three job demands dimensions are also correlated and all are positively associated with burnout, and negatively with engagement. As expected, teamwork effectiveness was found to be negatively related to both job demands and burnout, and positively related to engagement.

3.2. Aggregating teamwork effectiveness at department level

We calculated a_{wg} for 107 departments. Fourteen departments had inter-rater agreement coefficients below .45 and were excluded from further analyses (Bliese, 2000). Low inter-rater coefficients indicate a lack of agreement between unit members assessing the same unit-level variable. The lack of consensus indicate that there is not a shared understanding within the unit concerning the level at which a particular unit characteristic, such as teamwork effectiveness, is manifested. Although such units with low agreement would be more interesting from a consultancy point of view, they should be excluded from analysis (Bliese, 2000). For the remaining 93 departments ($N = 1156$) the average a_{wg} was .72 ($.45 < a_{wg} < 1.00$), with an ICC(1) of .20 and an ICC(2) of .75 ($F = 4.08$, $p < .001$). These results indicated enough evidence for aggregating teamwork effectiveness data at department level for the remaining 93 departments.

3.3. Results of the multilevel regression analysis

Table 2 presents the results of the multilevel regression analysis we performed with emotional exhaustion as a dependent variable. The intercept only model (M0) indicated that 24% of the variance in emotional exhaustion ($ICC(1) = .243$) is explained by unit-level variables, justifying the multilevel regression analysis (Montgomery et al., 2013). Level one predictors (job demands) were entered in the analysis (M1) in the next step. The reduction in deviance indicated by the chi square test ($\chi^2(9) = 843.290$, $p < .001$) suggested a better fit of M1 compared to M0.

Results of M1 also indicate that all job demands variables were positively associated with emotional exhaustion as we hypothesized (H1a). Emotional demands were the strongest predictor as indicated by the standardized coefficients under M1 in Table 2.

The following model (M2) tested the main effect of the department level variable (teamwork effectiveness) on emotional exhaustion. Teamwork effectiveness was not found to have a significant effect on emotional exhaustion and M2 was not found to have a better fit when compared with M1 ($\chi^2(0) = 4.794$, $p > .500$). As a result, we found no support for H3a and the premises to test H5a were not met.

Table 3 presents the results of the analysis performed with depersonalization as a dependent variable. M0 showed that 18% of the variance in the depersonalization scores ($ICC(1) = .184$) is explained by unit-level variables. M1 was found to have a better fit when compared to M0 ($\chi^2(9) = 702.365$, $p < .001$). All job demands variables were found to have a significant positive effect on depersonalization as H1(b) predicted. Once again, emotional demands were the strongest predictor as the standardized coefficients show. No support for H3b was found. Teamwork effectiveness within department does not have a significant negative effect on depersonalization. Also, the premises for testing H5b were not met given that M2 was not found to have a better fit than M1 ($\chi^2(0) = 0.199$, $p > .500$).

Table 4 presents the results of the analysis performed with vigor as a dependent variable. M0 showed that 27% of the variance in the vigor scores ($ICC(1) = .272$) is explained by second-level, department variables. The chi square difference ($\chi^2(9) = 603.486$, $p < .001$) showed a better fit of M1 when compared to M0. Job demands measures were negatively associated with vigor. The standardized

coefficients under M1 in Table 4 show that emotional demands and organizational demands are the strongest predictors of vigor, but also that workload is significantly associated. Although teamwork effectiveness was found to have a significant effect on vigor, as indicated by the standard coefficient under M2, the M2 model was not found to have a better fit when compared with M1 ($\chi^2(0) = 31.469$, $p > .500$), indicating no evidence for supporting a statistical significant improvement in the variance explained after adding level two teamwork effectiveness to the model. As a result we found support for H2a, linking individual level predictors to vigor, but not enough evidence for linking teamwork effectiveness, at the group level, to vigor as stated by H4a.

Table 5 presents the results of the model we tested with dedication as dependent variable. The intercept only model (M0) indicated that 18% of the variance in dedication ($ICC(1) = .181$) is explained by unit-level variables. Level one predictors (job demands) were entered in the analysis (M1) in the next step. Only organizational demands and emotional demands were found to be significantly associated with dedication, but not workload, so partial support was found for H2b.

Overall, the difference in chi square ($\chi^2(9) = 580.128$, $p < .001$) indicated a better fit of M0 over M1. Teamwork effectiveness was entered in the analysis in M2. Once again, although it was found to be a very strong predictor of dedication, the chi square difference ($\chi^2(0) = 22.861$, $p > .500$) between M2 and M1 was not significant, indicating no support for H4b.

Given that the results of this study are based on self-reported data, and that the items measuring both engagement and teamwork effectiveness are positively worded, we considered the effect of a common method bias in explaining the effect of teamwork effectiveness on engagement (Richardson, Simmering, & Sturman, 2009; Williams, Hartman, & Cavazotte, 2010). To test for common method bias we tested a latent variable model with marker variable (negative affectivity) as described by Williams and collaborators (Williams et al., 2010). Results of the analysis showed that the common factor explained 5% of the variance suggesting that our findings are due to more than just the effect of the common method used for data collection.

4. Discussion

Our aim was to test the main assumptions of the JD-R (Bakker & Demerouti, 2007; Demerouti & Bakker, 2011) by investigating the association of job demands on nurses' burnout and work engagement and the moderating effect of teamwork effectiveness within medical departments on individual perception of job demands and burnout. More specifically, we tested these assumptions via five hypotheses. Hypothesis 1, concerning the direct effect between job demands and burnout was confirmed, with emotional demands representing the most significant associations. Hypothesis 2, concerning the direct effect between demands and engagement, all job demands were related to vigor, but only organizational and emotional demands were related to dedication. In terms of Hypotheses 3 and 4, no support was found for an association between department level teamwork effectiveness and either burnout, but teamwork effectiveness was associated with engagement. Hypotheses 5a and 5b, the moderation effect, was not tested as the required premises were not met. We conducted the appropriate tests to rule out the possibility of common method bias, thus the research offers only partial support the JD-R model. The non-significant results may be explained by the fact that nurses view job demands differently from other occupations, in that teamwork effectiveness serves to bolster feelings of vigor and dedication but is not connected to demands which are influenced by patient intake. At a practical level, the results question whether improving/increasing resources can ameliorate burnout. Our results are

Table 2
Results of the multi-level regression analysis with emotional exhaustion as dependent variable (93 departments, N = 1156).

VD: emotional exhaustion	M0		M1			M2		
	Coeff.	SE	Coeff.	SE	Std. coeff.	Coeff.	SE	Std. coeff.
Intercept	20.499 ^{***}	.764	20.680 ^{***}	.620		20.724 ^{***}	.608	
Workload			2.901 ^{***}	.373	0.178 ^{***}	2.934 ^{***}	.375	0.180 ^{***}
Organizational demands			2.291 ^{***}	.472	0.150 ^{***}	2.768 ^{***}	.487	0.181 ^{***}
Emotional demands			4.421 ^{***}	.585	0.244 ^{***}	4.468 ^{***}	.585	0.247 ^{***}
Teamwork					−2.849	1.639	−.099	
σ^2		123.958		96.44912				
ICC(1)		.243						
ICC(2)		.733						
Deviance		8967.511		8124.220			8119.426	
χ^2 (df)				843.290(9) ^{***}			4.794(0)	

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3
Results of the multi-level regression analysis with depersonalization as dependent variable (93 departments, N = 1156).

VD: depersonalization	M0		M1			M2		
	Coeff.	SE	Coeff.	SE	Std. coeff.	Coeff.	SE	Std. coeff.
Intercept	5.336 ^{***}	.333	5.387 ^{***}	.264		5.406 ^{***}	.262	
Workload			.675 ^{***}	.209	0.086 ^{***}	.683 ^{***}	.212	0.087 ^{***}
Organizational demands			1.119 ^{***}	.314	0.152 ^{***}	1.070 ^{***}	.319	0.146 ^{***}
Emotional demands			2.432 ^{***}	.325	0.279 ^{***}	2.444 ^{***}	.328	0.280 ^{***}
Teamwork						−.570	.537	−0.041
σ^2		30.716		23.97957			24.014	
ICC(1)		.184						
ICC(2)		.664						
Deviance		7331.651		6629.285			6629.484	
χ^2 (df)				702.365(9) ^{***}			0.199(0)	

* $p < .05$.

** $p < .01$.

*** $p < .001$.

consistent with Herzberg's motivation-hygiene theory that separate factors influence job satisfaction and dissatisfaction (Herzberg, Mausner, & Snyderman, 1959).

Teamwork is a job resource that has the ability to influence motivation. Job resources gain their motivational potential particularly when employees are confronted with high job demands that lead to burnout. According to the JD-R model, when employees are faced with high emotional demands, social support of colleagues might become more visible and more instrumental. Although we found evidence that there is a department level influence on individual ratings of job burnout and work engagement, this effect was explained by unit-level teamwork effectiveness only in the case of engagement. Thus, teamwork effectiveness can influence

motivation rather than strain, which contributes to the evidence that burnout and engagement are not simply polar opposites. This result is consistent with research on burnout and engagement indicating that burnout and engagement exhibit different patterns of possible causes and consequences, suggesting that different intervention strategies should be used when burnout is to be reduced or engagement is to be enhanced (Schaufeli & Bakker, 2004).

It appears that there might be other unit-level or individual level predictors that are relevant in explaining individual levels of burnout among nurses. Some previous studies have found that a shared perception of a burnout climate (González-Morales et al., 2012) or a climate of authenticity (Grandey, Foo, Groth, & Goodwin, 2012) influences individual ratings of burnout. Additionally, Bliese

Table 4
Results of the multi-level regression analysis with vigor as dependent variable (93 departments, N = 1156).

VD: vigor	M0		M1			M2		
	Coeff.	SE	Coeff.	SE	Std. coeff.	Coeff.	SE	Std. coeff.
Intercept	24.980 ^{***}	.509	25.095 ^{***}	.426		25.040 ^{***}	.353	
Workload			−.627 [*]	.314	−.061 [*]	−.682 [*]	.299	−.066 [*]
Organizational demands			−1.488 ^{***}	.368	−.154 ^{***}	−1.315 ^{***}	.372	−.136 ^{***}
Emotional demands			−1.890 ^{***}	.379	−.165 ^{***}	−1.898 ^{***}	.392	−.165 ^{***}
Teamwork					5.033 ^{***}	.882	.276 ^{***}	
σ^2		48.870		44.055			43.761	
ICC(1)		.272						
ICC(2)		.760						
Deviance		7899.906		7296.419			7264.950	
χ^2 (df)				603.486(9) ^{***}			31.469(0)	

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 5
Results of the multi-level regression analysis with dedication as dependent variable (93 departments, N = 1156).

VD: dedication	M0		M1			M2		
	Coeff.	SE	Coeff.	SE	Std. coeff.	Coeff.	SE	Std. coeff.
Intercept	21.458***	.392	21.505***	.332		21.532***	.289	
Workload			-.054	.329	-.006	-.032	.323	-0.003
Organizational demands			-1.451***	.327	-.169***	-1.254***	.341	-.146***
Emotional demands			-1.144***	.395	-.112***	-1.200***	.393	-.118***
Teamwork						3.533***	.679	.218***
σ^2		42.633					38.069	
ICC(1)		.181						
ICC(2)		.661						
Deviance		7713.154					7110.164	
χ^2 (df)							580.128(9)***	22.861(0)

* $p < .05$.

** $p < .01$.

*** $p < .001$.

and Britt (2001), in a sample of US soldiers, found that work stressors has a weaker relationship with strains when individuals were members of a group that had high consensus about their leadership. Future research should explore such unit-level relevant predictors as they might play a key role in designing interventions to reduce burnout among nurses. We did find evidence of a strong association of teamwork effectiveness within medical departments on individual levels of vigor and dedication, suggesting that teamwork effectiveness is an important contributor in increasing nurses' engagement.

We found evidence supporting the positive relationship between job demands and burnout. Although the relationship is well established in the literature (Bakker et al., 2004, 2005; Brough et al., 2013; Hakanen et al., 2006; Schaufeli & Bakker, 2004), most studies were conducted in the Western context. Burke (2010) discussed the difficulty in obtaining information about work stress and engagement outside the Western world. Our data, collected on a sample of nurses from Bulgaria, Croatia, Greece, FYROM, Portugal, Romania and Turkey, show that the relationship between job demands and burnout is consistent outside the Western context also. Results also show that job demands also are associated with work engagement, especially emotional and organizational demands. Previous studies have found inconsistent evidence of the direct effect of job demands on engagement and it was suggested that the relationship depends on the type of profession investigated and the type of job demands measured (Crawford et al., 2010).

We did not find evidence of a cross-level interaction between teamwork effectiveness and individual perceptions of job demands and burnout, although previous studies suggest that a collegial relations between doctors and nurses is associated with reduced the levels of burnout in nurses (Li et al., 2013). At the unit level demands and resources may be independent. For example, Consiglio, Borgogni, Alessandri, and Schaufeli (2013), in sample of call center workers, found that at the team level demands and resources seemed to be independent of each other, whereas, at the individual level, they were negatively related. Future research should explore whether shared resources among nurses from the same unit play a role in moderating their perceptions of job demands and burnout.

Our results add to the findings of previous qualitative studies suggesting that a good professional collaboration among members of the same medical unit, either a department (Lipshitz & Popper, 2000) or a project-based team (Edmondson, 2003) contributes to a positive working experience for nurses and increases their willingness to remain part of their unit, but also increases the performance of the unit as a whole (Edmondson, 1996, 2003; Lipshitz & Popper, 2000).

The implications for practice are twofold. Firstly, the non-significant results seriously question an 'one size fits all' approach to organizational interventions. Collaborative bottom-up approaches that obligate nurses, physicians and patients to be involved in redesigning healthcare delivery (using an action research approach) have the only real change of success (Panagopoulou, Montgomery, & Tsigas, 2015). Secondly, our results with regard to teamwork effectiveness and engagement are congruent with the emerging evidence that one can build empowering work environments using a Civility, Respect, and Engagement in the Workplace (CREW) intervention among nurses (Laschinger, Leiter, Day, Gilin-Oore, & Mackinnon, 2012). Although we did not find any evidence that teamwork effectiveness diminishes the perception of job demands, it was found to be associated with engagement – both vigor and dedication – suggesting that teamwork effectiveness, which signifies collegial respect and common purpose, enhances feelings of acceptance. Given the important role of emotional demands in our data, future research should assess to whether meaningful connections can be found between individual emotional regulation, organizational design (i.e., healthcare delivery) and healthcare professional wellbeing.

5. Limitations

Some limitations of this study should be addressed. First, all data analyzed are nurses self-reports collected at the same moment in time and the results might be influenced by common method bias. Analysis of the latent variable model with negative affectivity as the marker variable indicated that 5% of the common variance in engagement and teamwork effectiveness can be explained by the data collection method (Williams et al., 2010). Second, we used a cross-sectional correlational design and caution is needed in inferring the causal relationships. Third, the possibility of a Type I error is a possibility given that we examine a range of dependent variables which increase the possibility of chance capitalization. Fourth, we assessed the influence of negative affect but there are many other biases (e.g., social desirability; acquiescence; consistency) that could have influenced our self-report measures. Fifth, the lack of evidence to support a cross-level interaction might be explained by the level at which teamwork effectiveness was measured in our sample. Participants were asked to refer to their entire department when rating teamwork effectiveness. It might be that a stronger support comes from within nurse units and not from departments as a whole. Finally, we had no data on the representatives of participants in each department. In some cases all of the nurses from a department participated in the study, while in others only a few members filled in the questionnaire. Although we included in the

study only departments from which we had at least four participants, we cannot exclude a self-selection bias.

The fact that more than 10% of the teams had to be discarded due to low inter-rater agreement is of particular interest. Such a group should be of interest to future researchers with regard to why might teams disagree, and what effect such disagreement could have on burnout or engagement. Researchers could also investigate whether there is enough variability in levels of agreement across teams, and whether levels of agreement could be used as a predictor. Such teams could be of considerable depending on their spread across organizations and medical specialties.

6. Conclusions

We investigated the moderating role of teamwork effectiveness within medical departments on nurses professional-well being. We found that there is a department level effect on explaining both burnout and engagement among nurses. This effect was explained by teamwork effectiveness only in the case of engagement, but not in the case of burnout. We did not find evidence that teamwork effectiveness within medical department buffers nurses' individual perception of job demands and burnout. Our findings suggest that interventions aiming at facilitating work engagement among nurses should also address department characteristics such as the amount of teamwork and collaboration between health professionals working within the same department.

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