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# Demographic and occupational predictors of stress and fatigue in French intensive-care registered nurses and nurses' aides: A cross-sectional study

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ABSTRACT

*Background:* Healthcare workers (HCWs) working in intensive-care units (ICUs) are exposed to high physical and mental demands potentially affecting their health or having repercussions on patient care. Although several studies have explored the links between some aspects of working conditions in hospitals and HCW health, the complex dynamics at play are not fully understood.
*Objectives:* This study aimed to explore the impact of a wide array of demographic, employment and organizational factors related to fatigue and stress of French ICU HCWs.
*Design and setting:* A cross-sectional study was conducted in ICUs of Paris-area hospitals between January 18, 2013 and April 2, 2013. All types of adult ICUs were included (medical, surgical and polyvalent).
*Participants:* Included in the study were HCWs with patient contact (doctors, residents, registered nurses, nurse's aides and physical therapists). Participation was proposed to all eligible HCWs present during on-site visits. Temporary staff not typically assigned to the given ICU was excluded.
*Methods:* Data were collected using an individual questionnaire administered in interviews during day and night shifts ($N = 682$). Stress and fatigue outcomes included the 10-item Perceived Stress Scale (PSS10), the Nottingham Health Profile sleep and energy level rubrics and the current fatigue state at the interview. Multivariate analysis was restricted to nurse and nurse's aide data ($n = 536$).
*Results:* Doctors and residents reported fewer sleep difficulties but were more likely to report a tired current state. Female gender was associated with higher stress levels and greater fatigue for all outcomes, while greater social support of supervisor or colleagues decreased stress and fatigue. At the organizational level, longer shifts (12 h vs. 8 h) were associated with tired current state and greater sleep difficulties. Personnel on rotating shifts had lower stress and a better current state, while those on night shifts had greater sleep and energy level difficulties.
*Conclusions:* Even when controlling for demographic factors, employment and organizational elements remained significantly associated with stress and fatigue outcomes. To improve HCW health it is important to consider simultaneously factors at the individual and organizational level.



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**What is already known about this topic?**

- Past studies show that the high physical and mental demands in ICUs can affect HCW fatigue and stress levels.
- Workplace organization and its impact on stress and fatigue can have potential repercussions on patient care.
- Although several studies have explored the links between some aspects of working conditions in hospitals and HCW health, the complex dynamics at play are not fully understood.

**What this paper adds**

- This study demonstrates that even when controlling for demographic factors, both individual employment and organizational factors are highly predictive of stress and fatigue among registered nurses and nurse's aides.
- The results illustrate the multiple dimensions that are in play when evaluating the effect of organizational policies (shift length and rotation, workload) on HCW health.

## 1. Introduction

Healthcare workers (HCWs) working in hospital settings are exposed to high physical and mental demands which may affect their fatigue and stress levels, with potential repercussions on patient care (Adriaenssens et al., 2011; Barker and Nussbaum, 2011; Dorrian et al., 2008; Geiger-Brown et al., 2011; Kawano, 2008; Rogers et al., 2004; Scott et al., 2006; Virtanen et al., 2009; Wu et al., 2010). Reducing stress and fatigue through organizational structures that minimize negative effects on HCWs is thus of great interest for hospitals in order to promote worker health and ensure patient safety.

Several studies have explored the relationship between some aspects of working conditions within hospitals and HCW health or patient safety. Notably, longer work hours, overtime, working night shifts, and rotating shift work were found to be associated with increased fatigue and an increased risk of medical error or near error (Arimura et al., 2010; Dorrian et al., 2008; Rogers et al., 2004; Scott et al., 2006). Poor social support has been linked to increased risk of injury and burnout, increased stress, fatigue and anxiety, and a greater likelihood of emotional exhaustion and poor health scores (Coffey and Coleman, 2001; Gershon et al., 2007; Kawano, 2008; Sveinsdottir et al., 2006; Wu et al., 2010). In a study combining patient infection prevalence surveillance and personnel questionnaires distributed to registered nurses, Virtanen et al. (2009) reported that in addition to work >8.75 h, low trust among colleagues, unjust distribution of work and poor collaboration with supervisors were associated with a greater risk of patient infection.

However, the determinants and effects of stress and fatigue generated in hospital environments are multifactorial. It is not sufficient to evaluate an organizational structure on the basis of a single or a few dimensions (Ferguson and Dawson, 2012); studies including a comprehensive evaluation of the impact of a wide array of organizational factors on both physical and mental HCW health are needed to better understand the multiple dynamics present in hospital settings.

Here, we propose a multivariate study of individual and organizational factors related to fatigue and stress levels of HCWs. To that aim, we present results from a large-scale cross-sectional study performed in 31 French adult ICUs.

## 2. Materials and methods

### 2.1. Study aim and hypotheses

Previously published studies suggest that stress and fatigue of HCWs have a wide range of predictors, both personal and job-related (Adriaenssens et al., 2011; Barker and Nussbaum, 2011; Coffey and Coleman, 2001; Geiger-Brown et al., 2012; Gershon et al., 2007; Kawano, 2008; Rogers et al., 2004; Wu et al., 2010). In this study, we hypothesized that they could be predicted by factors classifiable into three categories: demographic factors (such as age or gender), individual employment factors (such as profession or the years of experience) and job organization factors (such as shift length or nurse/patient ratio). Part of our study was based on the social support dimension of the Job Demand Control Support model (Karasek, 1990). In this model, psychological strain (fatigue, anxiety and depression) is seen as a possible consequence of low social support at work from supervisor and/or colleagues. However, the model does not take into account the environmental or organizational context in which work tasks take place, which is why we added organizational characteristics as potential stress predictors (Adriaenssens et al., 2011).

### 2.2. Study design and population

A cross-sectional study was conducted in ICUs of Paris-area hospitals of the Assistance Publique des Hôpitaux de Paris (AP-HP) between January 18, 2013 and April 2, 2013. The study population consisted of HCWs with patient contact (registered nurses (RNs), nurse's aides, physical therapists, doctors and residents) working in the ICUs. Temporary staff not typically assigned to the given ICU were excluded. All types of adult ICUs were included in the study (medical, surgical and polyvalent).

### 2.3. Ethical considerations

The study protocol was elaborated in collaboration with the AP-HP Department of medical policy and the Department of care and of paramedical activities, and was approved after presentation to the Directorate General and the Committee on hygiene, safety and working conditions. Potential participants were informed of the study by a letter of information that was sent to the head doctor and nursing manager for distribution and/or posting in the unit. Participants were guaranteed confidentiality and anonymity of responses.

### 2.4. Data collection

All adult ICUs of the AP-HP ($N = 35$) were contacted by email with follow-up by phone for participation in the study (recruitment from December 2012 to January 2013)